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l37 not l36	0

Database: US Patents Full-Text Database; US Pre-Grant Publication Full-Text Database; JPO Abstracts Database; EPO Abstracts Database; Derwent World Patents Index; IBM Technical Disclosure Bulletins

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Search History

Today's Date: 2/4/2002

DB Name	Query	Hit Count	Set Name
USPT,PGPB,JPAB,EPAB,DWPI	l37 not l36	0	L38
USPT,PGPB,JPAB,EPAB,DWPI	l35 and l18	3	L37
USPT,PGPB,JPAB,EPAB,DWPI	l14 and l35	5	L36
USPT,PGPB,JPAB,EPAB,DWPI	l27 and l34	41	L35
USPT,PGPB,JPAB,EPAB,DWPI	l31 and l33	273	L34
USPT,PGPB,JPAB,EPAB,DWPI	l2 same l32	3014	L33
USPT,PGPB,JPAB,EPAB,DWPI	l4 or newspaper$1 or (saw dust) or (cotton lint) or (cobs near2 (ground or flower or flour)) or metrecz or (diatomac$4 earth)	62786	L32
USPT,PGPB,JPAB,EPAB,DWPI	(filler$1 or interspatial or intersti$6) same l29	53263	L31
USPT,PGPB,JPAB,EPAB,DWPI	(filler$1 or interspatial or intersti$6) and l29	106008	L30
USPT,PGPB,JPAB,EPAB,DWPI	l16 or gel$4 or collagen or latex or (terpene resin$1) or asphalt$1 or cement$1 or silicates	878782	L29
USPT,PGPB,JPAB,EPAB,DWPI	l26 and l27	2	L28

USPT,PGPB,JPAB,EPAB,DWPI	fertili$6 or herbicid$6 or insecticid$6 or fungicid$6 or agricultur$5 or agrochemical$4	312536	L27
USPT,PGPB,JPAB,EPAB,DWPI	l4 same l25	6	L26
USPT,PGPB,JPAB,EPAB,DWPI	l2 same l24	11927	L25
USPT,PGPB,JPAB,EPAB,DWPI	steam	295522	L24
USPT,PGPB,JPAB,EPAB,DWPI	l3 and l21	0	L23
USPT,PGPB,JPAB,EPAB,DWPI	l2 and l21	76	L22
USPT,PGPB,JPAB,EPAB,DWPI	l4 and l18	114	L21
USPT,PGPB,JPAB,EPAB,DWPI	l6 and l18	0	L20
USPT,PGPB,JPAB,EPAB,DWPI	l17 and l18	36	L19
USPT,PGPB,JPAB,EPAB,DWPI	control$3 releas$3	29617	L18
USPT,PGPB,JPAB,EPAB,DWPI	l15 and l16	49	L17
USPT,PGPB,JPAB,EPAB,DWPI	starch$2	159264	L16
USPT,PGPB,JPAB,EPAB,DWPI	l13 and l14	85	L15
USPT,PGPB,JPAB,EPAB,DWPI	l7 or l8 or l9	6471	L14
USPT,PGPB,JPAB,EPAB,DWPI	l2 and l4	2205	L13
USPT,PGPB,JPAB,EPAB,DWPI	l6 and l9	0	L12
USPT,PGPB,JPAB,EPAB,DWPI	l6 and l8	0	L11
USPT,PGPB,JPAB,EPAB,DWPI	l6 and l7	0	L10
USPT,PGPB,JPAB,EPAB,DWPI	ferbam$1 or ((iron or ferric) near3 (trisdimethyldithiocarbam$3 or dimethyldithiocarbam$3 or trisdimethylcarbamodithio$3 or dimethylcarbamodithio$3 or dimethyldithiocarbamato or trisdimethyldithiocarbamato)) or trifungol or ferberk or hexaferb or knockmate or aafertis	761	L9
USPT,PGPB,JPAB,EPAB,DWPI	diazinon or (diethyl adj3 (((methyl near2 (methylethyl or isopropyl)) adj2 (pyrimidinylphosphorothio$3 or (pyrimidinyl phosphorothio$3))) or ((methylethyl or isopropyl) adj2 (methylpyrimidinylphosphorothio$3 or (methylpyrimidin$2 adj3 phosphorothio$3))))) or basudin or neocidol or diazitol or nucidol or spectracide or sarolex or g24480 or diazol or dazzel or gardentox or kayazinon or kayazol or "knox-out" or nipsan or disonex or drawizon	2599	L8
USPT,PGPB,JPAB,EPAB,DWPI	"2,4-d" or dichlorophenonoxyacet$3 or (dichlorophenoxy adj acet$3) or hedonal or spritz-hormin or fernimine or fernoxone or agroxone or desormone or netagrone or planotox or dacamine or emulsamine or weedone or weedar or weed-b-g0n or weed-rhap	3624	L7
USPT,PGPB,JPAB,EPAB,DWPI	l5 and l3	63	L6

USPT,PGPB,JPAB,EPAB,DWPI	(expanded or exfoliated) with l4	2632	L5
USPT,PGPB,JPAB,EPAB,DWPI	perlite	10127	L4
USPT,PGPB,JPAB,EPAB,DWPI	l1 same l2	11666	L3
USPT,PGPB,JPAB,EPAB,DWPI	absorb$6	869360	L2
USPT,PGPB,JPAB,EPAB,DWPI	capillar$4 or intersti$5	149678	L1

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Search Results - Record(s) 1 through 10 of 36 returned.

☑ 1. Document ID: US 6036971 A

L19: Entry 1 of 36 File: USPT Mar 14, 2000

US-PAT-NO: 6036971
DOCUMENT-IDENTIFIER: US 6036971 A

TITLE: Coated granular pesticide method for producing the same and applications thereof

DATE-ISSUED: March 14, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Kimoto; Narutoshi	Kitakyushu			JPX
Kutsuzawa; Yoshiya	Kitakyushu			JPX
Ashihara; Michiyuki	Minamata			JPX

US-CL-CURRENT: 424/419; 424/417, 424/490, 424/497

Full | Title | Citation | Front | Review | Classification | Date | Reference KWIC | Draw Desc | Image

☐ 2. Document ID: US 5928998 A

L19: Entry 2 of 36 File: USPT Jul 27, 1999

US-PAT-NO: 5928998
DOCUMENT-IDENTIFIER: US 5928998 A

TITLE: Arylindazoles and their use as herbicides

DATE-ISSUED: July 27, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
James; Donald R.	El Sobrante	CA		
Baker; Don R.	Orinda	CA		
Mielich; Steven D.	Palo Alto	CA		
Michaely; William J.	El Cerrito	CA		
Fitzjohn; Steven	Bracknell			GBX
Knudsen; Christopher G.	Berkeley	CA		
Mathews; Christopher	San Francisco	CA		
Gerdes; John M.	Fairfax	CA		

US-CL-CURRENT: 504/281; 504/282, 548/361.1, 548/361.5, 548/362.5

Full | Title | Citation | Front | Review | Classification | Date | Reference KWIC | Draw Desc | Image

☑ 3. Document ID: US 5912207 A

L19: Entry 3 of 36 File: USPT Jun 15, 1999

US-PAT-NO: 5912207
DOCUMENT-IDENTIFIER: US 5912207 A

TITLE: Stable herbicidal compositions containing metal chelates of herbicidal dione compounds

DATE-ISSUED: June 15, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Scher; Herbert B.	Moraga	CA		
Chen; Jinling	El Cerrito	CA		

US-CL-CURRENT: 504/190; 504/191, 504/348, 544/225, 544/64, 546/11, 546/2, 548/402

Full | Title | Citation | Front | Review | Classification | Date | Reference KWIC | Drawi Desc | Image

☑ 4. Document ID: US 5876739 A

L19: Entry 4 of 36 File: USPT Mar 2, 1999

US-PAT-NO: 5876739
DOCUMENT-IDENTIFIER: US 5876739 A

TITLE: Insecticidal seed coating

DATE-ISSUED: March 2, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Turnblad; Kevin M.	Sioux Falls	SD		
Chen; Yuguang	Lakeville	MN		

US-CL-CURRENT: 424/408; 424/406, 424/417, 424/418, 424/419, 424/420, 504/150

Full | Title | Citation | Front | Review | Classification | Date | Reference KWIC | Drawi Desc | Image

☐ 5. Document ID: US 5763357 A

L19: Entry 5 of 36 File: USPT Jun 9, 1998

US-PAT-NO: 5763357
DOCUMENT-IDENTIFIER: US 5763357 A

TITLE: 3-substituted pyridine compounds and derivatives thereof

DATE-ISSUED: June 9, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Chin; Hsiao-Ling M.	Moraga	CA		
Nguyen; Nhan H.	Richmond	CA		
Kanne; David B.	Corte Madera	CA		
Lee; David L.	Pleasant Hill	CA		

US-CL-CURRENT: 504/239; 544/333

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

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☐ 6. Document ID: US 5739353 A

L19: Entry 6 of 36 File: USPT Apr 14, 1998

US-PAT-NO: 5739353
DOCUMENT-IDENTIFIER: US 5739353 A

TITLE: N-arylindoles and their use as herbicides

DATE-ISSUED: April 14, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Pallos; Ferenc M.	Walnut Creek	CA		
Mathews; Christopher J.	San Francisco	CA		

US-CL-CURRENT: 548/503; 548/469, 548/509, 548/510

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

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☐ 7. Document ID: US 5707930 A

L19: Entry 7 of 36 File: USPT Jan 13, 1998

US-PAT-NO: 5707930
DOCUMENT-IDENTIFIER: US 5707930 A

TITLE: 4-cycloalkyl-5-substituted pyrimidine compounds useful as crop protection agents

DATE-ISSUED: January 13, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Felix; Raymond A.	Richmond	CA		
Chin; Hsiao-Ling M.	Moraga	CA		
Woolard; Frank X.	Greenbrae	CA		
Lee; David L.	Pleasant Hill	CA		
Kanne; David B.	Corte Madera	CA		

US-CL-CURRENT: 504/197; 504/219, 504/221, 504/225, 504/239, 504/242, 504/243, 544/122, 544/243, 544/296, 544/58.6, 544/60

Full | Title | Citation | Front | Review | Classification | Date | Reference KWIC | Drawi Desc | Image

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☐ 8. Document ID: US 5672567 A

L19: Entry 8 of 36 File: USPT Sep 30, 1997

US-PAT-NO: 5672567
DOCUMENT-IDENTIFIER: US 5672567 A

TITLE: Herbicidal hydroxybenzyl-substituted heteroaryl compounds and derivatives thereof

DATE-ISSUED: September 30, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Chin; Hsiao-Ling M.	Moraga	CA		
Wei; Yi-Qiu	Pinole	CA		
Nguyen; Nhan H.	Richmond	CA		
Kanne; David B.	Corte Madera	CA		

US-CL-CURRENT: 504/239; 504/242, 504/243, 544/243, 544/298, 544/302, 544/335

Full | Title | Citation | Front | Review | Classification | Date | Reference KWIC | Drawi Desc | Image

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☐ 9. Document ID: US 5670453 A

L19: Entry 9 of 36 File: USPT Sep 23, 1997

US-PAT-NO: 5670453
DOCUMENT-IDENTIFIER: US 5670453 A

TITLE: Herbicidal hydroxybenzyl-substituted heteroaryl compounds and derivatives thereof

DATE-ISSUED: September 23, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Chin; Hsiao-Ling M.	Moraga	CA		
Wei; Yi-Qiu	Pinole	CA		
Nguyen; Nhan H.	Richmond	CA		
Kanne; David B.	Corte Madera	CA		

US-CL-CURRENT: 504/235; 544/120, 544/336, 544/357, 544/405, 544/410, 544/60

Full | Title | Citation | Front | Review | Classification | Date | Reference KWIC | Draw Desc | Image

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☐ 10. Document ID: US 5599774 A

L19: Entry 10 of 36 File: USPT Feb 4, 1997

US-PAT-NO: 5599774
DOCUMENT-IDENTIFIER: US 5599774 A

TITLE: N-arylindoles and their use as herbicides

DATE-ISSUED: February 4, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Pallos; Ferenc M.	Walnut Creek	CA		
Mathews; Christopher J.	San Francisco	CA		

US-CL-CURRENT: 504/284; 548/490, 548/491, 548/503, 548/509, 548/510

Full | Title | Citation | Front | Review | Classification | Date | Reference KWIC | Draw Desc | Image

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☐ 11. Document ID: US 5595958 A

L19: Entry 11 of 36 File: USPT Jan 21, 1997

US-PAT-NO: 5595958
DOCUMENT-IDENTIFIER: US 5595958 A

TITLE: 3-substituted pyridine compounds and derivatives thereof

DATE-ISSUED: January 21, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Chin; Hsiao-Ling M.	Moraga	CA		
Nguyen; Nhan H.	Richmond	CA		
Kanne; David B.	Madera	CA		
Lee; David L.	Pleasant Hill	CA		

US-CL-CURRENT: 504/250; 504/239, 504/242, 504/243, 504/252, 544/243, 544/298, 544/322, 544/333, 546/14, 546/22, 546/255 , 546/261, 546/266

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

☐ 12. Document ID: US 5585327 A

L19: Entry 12 of 36 File: USPT Dec 17, 1996

US-PAT-NO: 5585327
DOCUMENT-IDENTIFIER: US 5585327 A

TITLE: 4-substituted pyridyl-3-carbinol compositions and a co-herbicide

DATE-ISSUED: December 17, 1996

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Chin; Hsiao-Ling	Moraga	CA		
Wei; Yi-Qiu	Pinole	CA		
Nguyen; Nhan H.	Richmond	CA		
Ensminger; Michael P.	Petaluma	CA		
Willitts; Linda	Folsom	CA		
Dagarin; Derek P.	Richmond	CA		

US-CL-CURRENT: 504/132; 504/130, 544/124, 544/60, 546/22, 546/261, 546/266, 546/267, 546/283.4, 546/286, 546/288, 546/290, 546/294, 546/296, 546/297, 546/301, 546/302, 546/304, 546/343

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

☐ 13. Document ID: US 5451566 A

L19: Entry 13 of 36 File: USPT Sep 19, 1995

US-PAT-NO: 5451566
DOCUMENT-IDENTIFIER: US 5451566 A

TITLE: Herbicidal pyrrolopyridine compounds

DATE-ISSUED: September 19, 1995

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Mathews; Christopher J.	San Francisco	CA		

US-CL-CURRENT: 504/246; 546/113

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

☐ 14. Document ID: US 5444038 A

L19: Entry 14 of 36 File: USPT Aug 22, 1995

US-PAT-NO: 5444038
DOCUMENT-IDENTIFIER: US 5444038 A

TITLE: Arylindazoles and their use as herbicides

DATE-ISSUED: August 22, 1995

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
James; Donald R.	El Sobrante	CA		
Baker; Don R.	Orinda	CA		
Mielich; Steven D.	Palo Alto	CA		
Michaely; William J.	El Cerrito	CA		
Fitzjohn; Steven	Bracknell			GB2
Knudsen; Christopher G.	Berkeley	CA		
Mathews; Christopher	San Francisco	CA		
Gerdes; John M.	Fairfax	CA		

US-CL-CURRENT: 504/253; 504/281, 546/22, 546/275.7, 548/113, 548/361.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

☐ 15. Document ID: US 5430007 A

L19: Entry 15 of 36 File: USPT Jul 4, 1995

US-PAT-NO: 5430007
DOCUMENT-IDENTIFIER: US 5430007 A

TITLE: Certain herbicidal pyrazolopyridazines

DATE-ISSUED: July 4, 1995

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Michaely; William J.	El Cerrito	CA		
Curtis; Jeff K.	San Anselmo	CA		
Knudsen; Christopher G.	Berkeley	CA		

US-CL-CURRENT: 504/236; 504/237, 504/238, 544/236

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw. Desc | Image

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☐ 16. Document ID: US 5395817 A

L19: Entry 16 of 36 File: USPT Mar 7, 1995

US-PAT-NO: 5395817
DOCUMENT-IDENTIFIER: US 5395817 A

TITLE: N-arylindoles and their use as herbicides

DATE-ISSUED: March 7, 1995

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Pallos; Ference M.	Walnut Creek	CA		
Mathews; Christoper J.	San Francisco	CA		

US-CL-CURRENT: 504/252; 504/284, 546/277.4, 546/277.7, 546/278.1, 548/484, 548/485, 548/486, 548/492, 548/503

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw. Desc | Image

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☑ 17. Document ID: US 5317834 A

L19: Entry 17 of 36 File: USPT Jun 7, 1994

US-PAT-NO: 5317834
DOCUMENT-IDENTIFIER: US 5317834 A

TITLE: Agricultural processes and products

DATE-ISSUED: June 7, 1994

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Anderson; Neil C.	Monterey	CA		

US-CL-CURRENT: 47/48.5; 71/64.11

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw. Desc | Image

☐ 18. Document ID: US 5314865 A

L19: Entry 18 of 36 File: USPT May 24, 1994

US-PAT-NO: 5314865
DOCUMENT-IDENTIFIER: US 5314865 A

TITLE: Certain alkylidine aminooxyamide compounds useful as herbicides

DATE-ISSUED: May 24, 1994

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Walker; Francis H.	Mill Valley	CA		
Baker; Don R.	Orinda	CA		

US-CL-CURRENT: 504/244; 546/292

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

☐ 19. Document ID: US 5308826 A

L19: Entry 19 of 36 File: USPT May 3, 1994

US-PAT-NO: 5308826
DOCUMENT-IDENTIFIER: US 5308826 A

TITLE: Herbicidal 4-substituted pyridyl-3-carbinols

DATE-ISSUED: May 3, 1994

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Chin; Hsiao-Ling M.	Moraga	CA		
Wei; Yi Q.	Pinole	CA		
Nguyen; Nhan H.	Richmond	CA		

US-CL-CURRENT: 504/132; 504/130, 544/124, 544/60, 546/261, 546/268.1, 546/278.4, 546/279.1, 546/286, 546/288, 546/290, 546/294, 546/296, 546/297, 546/301, 546/302, 546/304, 546/343

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

☐ 20. Document ID: US 5300478 A

L19: Entry 20 of 36 File: USPT Apr 5, 1994

US-PAT-NO: 5300478
DOCUMENT-IDENTIFIER: US 5300478 A

TITLE: Substituted fused pyrazolo compounds

DATE-ISSUED: April 5, 1994

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Michaely; William J.	El Cerrito	CA		
Curtis; Jeff K.	San Anselmo	CA		
Knudsen; Christopher G.	Berkeley	CA		

US-CL-CURRENT: 504/246; 544/224, 544/236, 546/119, 546/120

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

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☐ 21. Document ID: US 5232899 A

L19: Entry 21 of 36 File: USPT Aug 3, 1993

US-PAT-NO: 5232899
DOCUMENT-IDENTIFIER: US 5232899 A

TITLE: Benzoxazolinones and their use as herbicides

DATE-ISSUED: August 3, 1993

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Pallos; Ferenc M.	Walnut Creek	CA		

US-CL-CURRENT: 504/252; 504/270, 546/271.7, 548/221

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

☐ 22. Document ID: US 5194661 A

L19: Entry 22 of 36 File: USPT Mar 16, 1993

US-PAT-NO: 5194661
DOCUMENT-IDENTIFIER: US 5194661 A

TITLE: Substituted benzyl carbamates and their use as herbicides

DATE-ISSUED: March 16, 1993

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Baker; Don R.	Orinda	CA		

US-CL-CURRENT: 504/303; 504/244, 504/250, 504/254, 504/257, 560/24, 560/29, 560/31, 560/32, 560/33

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

☐ 23. Document ID: US 5152827 A

L19: Entry 23 of 36 File: USPT Oct 6, 1992

US-PAT-NO: 5152827
DOCUMENT-IDENTIFIER: US 5152827 A

TITLE: Substituted phenyl carbamates and their use as herbicides

DATE-ISSUED: October 6, 1992

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Baker; Don R.	Orinda	CA		

US-CL-CURRENT: 504/303; 504/172, 504/182

Full | Title | Citation | Front | Review | Classification | Date | Reference KWIC | Draw Desc | Image

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☐ 24. Document ID: US 5099059 A

L19: Entry 24 of 36 File: USPT Mar 24, 1992

US-PAT-NO: 5099059
DOCUMENT-IDENTIFIER: US 5099059 A

TITLE: Substituted phenyl carbamates and their use as herbicides

DATE-ISSUED: March 24, 1992

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Baker; Don R.	Orinda	CA	94563	

US-CL-CURRENT: 504/303; 504/172, 504/182, 560/24, 560/30, 560/31, 560/32, 560/33

Full | Title | Citation | Front | Review | Classification | Date | Reference KWIC | Draw Desc | Image

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☐ 25. Document ID: US 5078783 A

L19: Entry 25 of 36 File: USPT Jan 7, 1992

US-PAT-NO: 5078783
DOCUMENT-IDENTIFIER: US 5078783 A

TITLE: Substituted alkyl carbamates and their use as herbicides

DATE-ISSUED: January 7, 1992

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Baker; Don R.	Orinda	CA		

US-CL-CURRENT: 504/303; 504/172, 504/182, 504/302, 558/417, 560/160, 560/161, 560/164

Full | Title | Citation | Front | Review | Classification | Date | Reference KWIC | Draw Desc | Image

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☐ 26. Document ID: US 5022915 A

L19: Entry 26 of 36 File: USPT Jun 11, 1991

US-PAT-NO: 5022915
DOCUMENT-IDENTIFIER: US 5022915 A

TITLE: Substituted 2,4-diarylpyrimidines and their use as herbicides

DATE-ISSUED: June 11, 1991

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Prisbylla; Michael P.	Richmond	CA		

US-CL-CURRENT: 504/225; 504/168, 504/177, 504/178, 504/239, 504/242, 504/243, 544/122, 544/123, 544/242, 544/298, 544/319, 544/333, 544/335

Full | Title | Citation | Front | Review | Classification | Date | Reference KWIC | Draw Desc | Image

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☑ 27. Document ID: US 5022182 A

L19: Entry 27 of 36 File: USPT Jun 11, 1991

US-PAT-NO: 5022182
DOCUMENT-IDENTIFIER: US 5022182 A

TITLE: Agricultural processes and products

DATE-ISSUED: June 11, 1991

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Anderson; Neil C.	Chemainus			CAX

US-CL-CURRENT: 47/48.5; 47/57.5, 71/64.11, 71/904

Full | Title | Citation | Front | Review | Classification | Date | Reference KWIC | Draw Desc | Image

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☐ 28. Document ID: US 5002605 A

L19: Entry 28 of 36 File: USPT Mar 26, 1991

US-PAT-NO: 5002605
DOCUMENT-IDENTIFIER: US 5002605 A

TITLE: Alkylidine aminooxyamide compounds useful in controlling undesirable vegetation

DATE-ISSUED: March 26, 1991

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Walker; Francis H.	Mill Valley	CA		
Baker; Don R.	Orinda	CA		

US-CL-CURRENT: 504/336; 504/176, 504/177, 504/178, 504/183, 504/244, 504/250, 504/251, 504/252, 504/253, 504/266, 504/289, 504/294, 504/296, 504/310, 504/339, 558/391, 558/413, 558/414, 564/162, 564/163, 564/166, 564/167, 564/168, 564/182

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

☐ 29. Document ID: US 4977270 A

L19: Entry 29 of 36 File: USPT Dec 11, 1990

US-PAT-NO: 4977270
DOCUMENT-IDENTIFIER: US 4977270 A

TITLE: Substituted 2,4-dioxodiazolidines and -thiadiazolidines and their use as herbicides

DATE-ISSUED: December 11, 1990

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Wee; Siok-Hui H.	Berkeley	CA		

US-CL-CURRENT: 548/321.1; 504/180, 504/261, 504/314

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

☐ 30. Document ID: US 4960457 A

L19: Entry 30 of 36 File: USPT Oct 2, 1990

US-PAT-NO: 4960457
DOCUMENT-IDENTIFIER: US 4960457 A

TITLE: Substituted 1,3-diphenyl pyrrolidones and their use as herbicides

DATE-ISSUED: October 2, 1990

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Woolard; Frank X.	Richmond	CA		

US-CL-CURRENT: 504/283; 504/166, 504/179, 548/543, 548/550

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☐ 31. Document ID: US 4958028 A

L19: Entry 31 of 36 File: USPT Sep 18, 1990

US-PAT-NO: 4958028
DOCUMENT-IDENTIFIER: US 4958028 A

TITLE: Process for the preparation of 5-substituted-3-phenyl imidazolidine-2,4-diones

DATE-ISSUED: September 18, 1990

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Prisbylla; Michael P.	Richmond	CA		

US-CL-CURRENT: 548/321.1; 546/274.4, 548/314.7, 548/315.1, 548/316.1, 548/318.5

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw. Desc | Image

☐ 32. Document ID: US 4956006 A

L19: Entry 32 of 36 File: USPT Sep 11, 1990

US-PAT-NO: 4956006
DOCUMENT-IDENTIFIER: US 4956006 A

TITLE: Substituted 1-phenyl pyrrolidones and their use as herbicides

DATE-ISSUED: September 11, 1990

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Woolard; Frank X.	Richmond	CA		

US-CL-CURRENT: 504/283; 504/166, 504/167, 504/178, 504/179, 504/252, 504/287, 548/530, 548/544, 548/551

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw. Desc | Image

☑ 33. Document ID: US 4923506 A

L19: Entry 33 of 36 File: USPT May 8, 1990

US-PAT-NO: 4923506
DOCUMENT-IDENTIFIER: US 4923506 A

TITLE: Polyhydroxy polymer delivery systems

DATE-ISSUED: May 8, 1990

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Huber; Ludwig K.	Wayne	PA		
Monsimer; Harold G.	E. Norriton	PA		

US-CL-CURRENT: 504/367; 504/347, 514/127, 514/132, 514/144, 514/628, 514/646, 514/86, 514/89

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

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☐ 34. Document ID: US 4911748 A

L19: Entry 34 of 36 File: USPT Mar 27, 1990

US-PAT-NO: 4911748
DOCUMENT-IDENTIFIER: US 4911748 A

TITLE: Herbicidal 5-substituted-3-phenyl-imidazolidine-2,4-diones

DATE-ISSUED: March 27, 1990

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Prisbylla; Michael P.	Richmond	CA		

US-CL-CURRENT: 504/278; 504/167, 504/169, 504/177, 504/180, 504/253, 548/314.7, 548/315.1, 548/316.1, 548/318.5, 548/321.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

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☐ 35. Document ID: US 4874422 A

L19: Entry 35 of 36 File: USPT Oct 17, 1989

US-PAT-NO: 4874422
DOCUMENT-IDENTIFIER: US 4874422 A

TITLE: 1-Phenyl-3-carboxyamidopyrrolidones and their use as herbicides

DATE-ISSUED: October 17, 1989

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Woolard; Frank X.	Richmond	CA		

US-CL-CURRENT: 504/287; 504/166, 504/167, 504/177, 504/179, 504/219, 504/225, 504/249, 544/141, 546/208, 548/518, 548/550

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

☑ 36. Document ID: US 4657582 A

L19: Entry 36 of 36 File: USPT Apr 14, 1987

US-PAT-NO: 4657582
DOCUMENT-IDENTIFIER: US 4657582 A

TITLE: Polyhydroxy polymer delivery systems

DATE-ISSUED: April 14, 1987

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Huber; Ludwig K.	Wayne	PA		

US-CL-CURRENT: 504/347; 424/410, 424/411, 504/361, 504/367, 514/132, 514/141, 514/144, 514/86, 514/89

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw. Desc | Image

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Display 10 Documents, starting with Document: 36

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L19: Entry 1 of 36 File: USPT Mar 14, 2000

DOCUMENT-IDENTIFIER: US 6036971 A
TITLE: Coated granular pesticide method for producing the same and applications thereof

ABPR:
A coated granular pesticide comprising a granular pesticide for use on plants which comprises at least one hardly water-soluble active ingredient and at least one water-swelling substance, and a thermoplastic resin-based film which covers the surface of the granular pesticide; a method for producing the same; and applications thereof. A surfactant, inorganic powder insoluble or hardly soluble in water, water-absorbing and/or water-soluble polymer fine powder, a thermosetting resin, or a biodegradable polymer insoluble or hardly soluble in water, or a combination thereof may be incorporated into the film. The coated granular pesticide can externally release the hardly water-soluble active ingredient due to the combined effects of the thermoplastic resin as the film-forming component and the water-swelling component as the core component whereby the water-swelling substance absorbs the water present in the exterior of the coated granular pesticide, which gradually penetrates into the granule through the coating film.

BSPR:
The present invention relates to a timed-release type or controlled release type pesticide. More specifically, the present invention pertains to a coated granular pesticide comprising a granular pesticide which comprises a hardly water-soluble active ingredient and a water-swelling substance and whose surface is covered with a film-foaming material comprising a thermoplastic resin as a principal component, a method for producing the same and a method for using the coated granular pesticide.

BSPR:
Japanese Patent Laid-Open Publication (JP-A) 286602/1990 discloses a granular controlled release pesticide which comprises mineral particles impregnated with a liquid active ingredient and hydrophobic fine particles which cover the surface of the mineral granules. However, the controlled release pesticide initiates the release of the active ingredient thereof immediately after the application thereof to fields and accordingly, it is not suitably applied to fields during the transplantation of seedlings.

BSPR:
Japanese Examined Patent Publication (JP-B) 5002/1989 discloses a sustained release pesticide which comprises a water-soluble or volatile active ingredient covered with a thermoplastic resin. In the controlled release pesticide, the active ingredient is released through the thermoplastic resin film. Therefore, this technique is suitable for water-soluble or volatile active ingredients, but it is difficult to apply the technique to hardly water soluble active ingredients. In general, most of the active ingredients used in herbicides are hardly soluble in water and if these active ingredients are covered with the films disclosed in JP-B 5002/1989, the resulting pesticide suffers from such problems that a desired herbicidal effect cannot be expected because of its extremely low release rate and that the active ingredient remains in the soil even after the harvesting of crops to thus cause contamination of the soil therewith.

BSPR:
JP-A 9304/1994 and JP-A 72805/1994 disclose timed-release, controlled release type pesticides, in which a part of the coating film is dissolved, after the application thereof to fields, to form openings through which the active ingredient is released. Moreover, JP-A 9303/1994 and JP-A 80514/1994 also

disclose timed-release, controlled release type pesticides, in which the active ingredient is released through cracks formed, after the application thereof to fields, on a part of the coating film. In these timed-release, controlled release type pesticides, however, the timed-release characteristics are achieved by the use of a coating film having a double layered structure and the method for the production thereof requires complicated steps and the resulting product is expensive. Moreover, since the active ingredient is released through small openings or cracks formed on the film, the release rate thereof is show and thus it is difficult to apply these techniques to hardly water-soluble active ingredients.

BSPR:
The present invention intends to eliminate the foregoing drawbacks associated with the existing controlled release pesticides and accordingly, it is an object of the present invention to provide a coated granular pesticide which does not release any active ingredient immediately after the application thereof to fields and initiates the release of the active ingredient after the lapse of a desired period of time and which can complete the release of the active ingredient during the cultivation period, in particular, those effectively applied to hardly water-soluble active ingredients. It is another object of the present invention to provide a method for producing the same and a method for using the same.

BSPR:
The coating film preferably comprises not more than 15% by weight of an ethylene/vinyl acetate copolymer. It is also preferred that the coating film comprises a surfactant, an powdery inorganic substance insoluble or hardly soluble in water, a water-absorbing and/or water-soluble fine polymer powder, a thermosetting resin or a biodegradable polymer insoluble or hardly soluble in water, which may be used alone or in any combination.

DEPR:
More specifically, in the coated granular pesticide according to the present invention, water present in the external environment penetrates into the inside of the coated granular pesticide through the coating film, where the water-swelling substance gradually absorbs the water to swell and grow its volume, thereby applying increasing stress to the coating film. When the stress due to the swelling exceeds the threshold stress of the coating film, cracks are formed on the film, through which water rapidly enters into the coated pesticide to accelerate the swelling of the water-swelling substance and thus to grow the cracks thereby rapidly disintegrating the coating film. Consequently, the hardly water-soluble active ingredient included in the granular pesticide comes in close contact with a large amount of water and as a result, the release of the hardly water-soluble active ingredient is initiated.

DEPR:
The moisture permeability of the film is greatly affected by the film-forming components, namely the thermoplastic resin used as a principal ingredient for the film and other components optionally incorporated such as surfactants, powdery inorganic substances, water-absorbing polymer fine particles, water-soluble polymer fine particles, thermosetting resins and/or hardly water-soluble or water-insoluble biodegradable polymers. The critical strength of the film is substantially dependent upon the film-forming components and the thickness of the film, for example, the kinds of thermoplastic resins used, the thickness and the uniformity of the film. The swelling properties of the granular pesticide vary depending on the kinds of the water-swelling substances as an ingredient of the granular pesticide.

DEPR:
Specific examples of the hardly water-soluble active ingredients usable herein are 1-(6-chloro-3-pyridylmethyl)-N-nitroimidazolidine-2-ylideneamine, 5-methyl-1,2,4-triazolo(3,4-b)benzothiazole, 3-allyloxy-1,2-benzoisothiazole-1,1-dioxide, 2-chloro-4-ethylamino-6-isopropylamino-s-triazine, 1-(2-chloroimidazo[1,2-a]pyridin-3-ylsulfonyl)-3-(4,6-dimethoxypyrimidin-2-ylurea, 2-chloro-4,6-bis(ethylamino)-s-triazine, 2-benzothiazol-2-yloxy-N-methylacetoanilide, methyl=-.alpha.-(4,6-dimethoxypyrimidin-2-ylcarbamoylsulfamoyl)-o-toluate, S-(4-chlorobenzyl)-N,N-diethylthiocarbamate, S-benzyl=1,2-dimethylpropyl(ethyl)thiocarbamate, 2,4-dichlorophenyl-3'-methoxy-4'-nitrophenyl ether, 2-methylthio-4-ethylamino-6-(1,2-dimethylpropylamino)-s-triazine,

4-(2,4-dichlorobenzoyl)-1,3-dimethyl-5-pyrazolyl-p-toluenesulfonate, 2-methylthio-4,6-bis(ethylamino)-s-triazine, S-1-methyl-1-phenylethyl=piperidine-1-carbothioate, 1-(.alpha., .alpha.-dimethylbenzyl)-3-(p-tolyl) urea, 2-chloro-N-(3-methoxy-2-tenyl)-2',6'-dimethylacetoanilide, 2-chloro-2',6'-diethyl-N-(butoxymethyl)acetoanilide, ethyl 2,4-dichlorophenoxy acetate, ethyl 2-methyl-4-chlorophenoxy acetate, (E)-(S)-1-(4-chlorophenyl)-4,4-dimethyl-2-(1H-1,2,4-triazol-1-yl)pent-1-en -3-ol, (2RS, 3RS)-1-(4-chlorophenyl)-4,4-dimethyl-2-(1H-1,2,4-triazol-1-yl)pentan-3-ol and 4'-chloro-2'-(.alpha.-hydroxybenzyl)isonicotinanilide.

DEPR:
The water-swelling substance used in the coated granular pesticide according to the present invention is a substance capable of undergoing a volume-expansion through absorption of water and examples thereof include bentonites, starches and highly water-absorbing polymers.

DEPR:
As has been well-known in the art, the water-swelling properties of bentonite vary depending on the composition and particle size thereof. Any particular problem does not arise even when using, for example, calcium type bentonite which is rich in calcium ions and magnesium ions and has a low swelling ability and activated type bentonite which is treated with soda to artificially impart the swelling activity, but preferred are sodium type bentonite which has a high swelling ability, i.e., which is capable of absorbing a large amount of water.

DEPR:
Examples of starches are naturally occurring starches such as corn starch and potato starch; and a variety of processed starch products such as oxidized starches, methylated starches and carboxymethylated starches.

DEPR:
Examples of highly water-absorbable polymers include highly water-absorbable cellulosic polymers, highly water-absorbable polyvinyl alcoholic polymers and highly water-absorbable acrylic polymers.

DEPR:
The coated granular pesticide may comprise, in the film, fine particles of a water-absorbing polymer and/or a water-soluble polymer in order to adjust the film-disintegration time of the pesticide. These fine particles of water-absorbing and/or water-soluble polymers show an effect of reducing the film-disintegration time of the film.

DEPR:
Examples of fine particles of water-absorbing and/or water-soluble polymers are fine particles of polyvinyl alcohol, polyvinylpyrrolidone, methyl cellulose, hydroxypropyl cellulose, hydroxyethyl cellulose, sodium carboxymethyl cellulose, hydroxypropylmethyl cellulose, calcium carboxymethyl cellulose, carboxymethylethyl cellulose, dextrin, alginates, gelatin, pectin, pullulan, polyacrylic acid, sodium polyphosphate, isobutylene copolymers and polyethylene oxide.

DEPR:
In the present invention, the coated granular pesticide and a mixture thereof may be applied to fields at any desired period, but they are preferably applied simultaneously with or immediately before the transplantation of seedlings since the time required for farm working can substantially be reduced. Particularly preferably, they are applied to holes or furrow formed on the side of seedlings simultaneously with transplantation of seedlings, or alternatively they are applied to a substrate for raising seedlings immediately before the transplantation thereof and immediately thereafter, the seedlings are transplanted to fields. It is also possible to combine the coated granular pesticide according to the present invention or a mixture thereof with a commercially available pesticide and to apply the resulting mixture so that the latter would be released during the controlled release term of the pesticide of the present invention.

DEPR:
The water-holding materials usable herein are not restricted to any specific one inasmuch as they have good water holding properties and examples thereof are natural soil, naturally occurring organic substances such as wood chips, scum of

pulp, peat-moss, sphagnum and coir; foamed resins; and inorganic porous materials such as perlite and vermiculite, but preferred are vermiculite, peat-moss and coconut meal because they are inexpensive and stable supply thereof can be ensured. These water-holding materials may be used alone or in a blend of at least two of them. In addition, these water-holding substances may further comprise various kinds of additives for controlling physicochemical properties such as pH and electrical conductivity (EC).

DEPR:
The substrate for raising seedling according to the present invention may be prepared by any conventionally known method. For instance, it can be prepared by admixing a water-holding material and the coated granular pesticide as well as optional components such as a fertilizer and micro elements in a mixing machine. The resulting mixture (the substrate for raising seedling according to the present invention) may be used in a variety of methods. For instance, it may be used as bed soil and/or soil cover in fields or nursery boxes; or it may be mixed with seeds upon seeding. In particular, when it is used in a nursery box, it can be recommended that a layer of a mixture of seeds with the substrate for raising seedling according to the present invention, which comprises a water-holding material, the coated granular pesticide and coated granular fertilizers, should be arranged between a bed soil layer and a soil cover layer. This is because the active ingredient, fertilizer components and micro elements are present in the vicinity of seeds and therefore, these components are absorbed through roots and used with a high efficiency, after rooting the seeds.

DEPR:
Moreover, the results observed for the coated granular pesticides 2 to 6 which differ from one another in the added amount of the surfactant indicate that the larger the amount of the surfactant added, the shorter the release-suppression term and that the addition of a surfactant is effective for the control of the release-suppression term.

DEPR:
The results listed in Table 9 indicate that the granules of Comparative Example 1 initiates the release of the active ingredient immediately after the introduction thereof into water, whereas for C.G.P. Nos. 13 to 22 according to the present invention, which comprise water-absorbing polymer fine particles and/or water-soluble polymer fine particles, any active ingredient is not detected, on day 1 after the introduction, clearly showing that the release of the active ingredient is initially inhibited and the active ingredient certainly undergoes sustained release in the samples of the present invention.

DEPR:
Moreover, the results observed for C.G.P. Nos. 13 to which differ from one another in the amount of Resin 1 included in the water-absorbing polymer fine particles and/or the water-soluble polymer fine particles with respect to the isobutylene type copolymer (Table 3) also indicate that the larger the amount of Resin 1, the later the release-suppression term of the active ingredient and that the control of the amount of Resin 1 would be effective for the adjustment of the release-suppression term.

DEPR:
The results listed in Table 10 indicate that the granules of Comparative Example 1 initiates the release of the active ingredient immediately after the introduction thereof into water, whereas for C.G.P. Nos. 23 to 32 according to the present invention, which comprise thermosetting resins, any active ingredient is not detected, on day 1 after the introduction, clearly showing that the release of the active ingredient is initially inhibited and the active ingredient certainly undergoes controlled release in the samples of the present invention.

DEPR:
A substrate for single cell transplanting, "Yosaku N-100" (Kyushu Chemical Industry Co., Ltd.), comprising vermiculite, peat-moss and perlite as principal components was used as the water-holding material. This water-holding material has such physico-chemical properties as an apparent specific gravity of 0.38 kg/L, a pH value (1:5 water) of 6.3, an EC value (1:5 water) of 0.5 mS/cm and a water content of 40% and the contents of fertilizer components are 100 mg/L of N, 500 mg/L of P.sub.2 O.sub.5 and 100 mg/L of K.sub.2 O. Among these, all of the nitrogen is originated from acetaldehyde-condensed urea (CDU). Furthermore, it also comprised citric acid-soluble MnO and B.sub.2 O.sub.3 in amounts of 0.2 mg/kg and 0.05 mg/kg, respectively. In addition, 2 g of C.G.P. 50 produced in the

foregoing production experiment was applyed on the mixture and then the mixture was stirred to give a substrate for flowers and ornamental plants.

DEPU:
(3) The coated granular pesticide of the present invention permits the release of the granular pesticide containing the hardly water-soluble active ingredient through the disintegration of the film thereof. Therefore, the pesticide does not result in the reduction of the release rate as the concentration on the active ingredient in the aqueous solution within the film is reduced and the active ingredient does not remain within the film over a long time period, unlike the conventional controlled release type coated granular pesticides, and the coated pesticide of the present invention can completely release the hardly water-soluble active ingredient, ensure a high utilization factor and is not accompanied by any danger due to residues. Moreover, the present invention also permits the reduction of the amount of the hardly water-soluble active ingredient to be used.

DEPU:
(7) In the present invention, it is very easy to control the release rate of the active ingredient by appropriately selecting components to be added to the film.

DEPV:
Starch: corn starch available from Wako Pure Chemnical Industry Co., Ltd.

DETL:
TABLE 1 Composition of G.P. (% by weight)
G. Active P. Ingredient Material I Material II Material III
A A.M..sup.1) A 10 bentonite 50 clay 40 B A.M. A 5 bentonite 95 C A.M. B 20 bentonite 40 starch 20 clay 20 D A.M. C 5 bentonite 5 kao- 85 polymer 5 lin E A.M. D 2 starch 95 gel- 1 ammonium 2 atin phosphate F A.M. A 15 bentonite 60 clay 25 G A.M. A 15 bentonite 30 clay 55 H A.M. E 7 bentonite 30 clay 63 I A.M. F 10 bentonite 30 clay 60 J A.M. E 7 bentonite 30 clay 53 A.M. F 10 K A.M. A 14.5 bentonite 30 clay 55.5 L A.M. C 3.5 bentonite 30 clay 66.5 M A.M. C 1 bentonite 30 clay 69

CLPR:
9. The coated granular pesticide as set forth in claim 1 wherein said pesticide can externally release the hardly water-soluble active ingredient thereof according to such a mechanism that the water-swelling substance absorbs water from the external environment, which gradually penetrates into the active ingredient through the coating film, the granular pesticide containing the water-swelling substance gradually expands, cracks are thus formed on the film after the elapse of a predetermined time, water rapidly enters into the active ingredient through the cracks thus formed, the swelling of the water-swelling substance is accelerated to thus greatly grow the cracks and to thus rapidly disintegrate the film and that the hardly water-soluble active ingredient included in the granular pesticide thus comes in close contact with a large amount of water.

CLPV:
wherein at least one of a water absorbing polymer fine powder or water-soluble polymer fine powder is incorporated into the film.

L19: Entry 3 of 36 File: USPT Jun 15, 1999

DOCUMENT-IDENTIFIER: US 5912207 A
TITLE: Stable herbicidal compositions containing metal chelates of herbicidal dione compounds

BSPR:
The choice of formulation and mode of application for any given herbicidal compound may affect its activity, and selection must be made accordingly. Herbicidal compositions may thus be formulated as granules, as wettable powders, as emulsifiable concentrates, as powders or dusts, as flowables, as solutions, as suspensions or emulsions, or as controlled release forms such as microcapsules.

BSPR:
Granular formulations include both extrudates and relatively coarse particles, and are usually applied without dilution to the area in which suppression of vegetation is desired. Typical carriers for granular formulations include sand, fuller's earth, attapulgite clay, bentonite clays, montmorillonite clay, vermiculite, perlite and other organic or inorganic materials which absorb or which can be coated with the active compound. Granular formulations normally contain about 5% to about 25% active ingredients which may include surface-active agents such as heavy aromatic naphthas, kerosene and other petroleum fractions, or vegetable oils; and/or stickers such as dextrins, glue or synthetic resins.

BSPR:
Microcapsules and encapsulated granules are typical controlled release formulations. Microcapsules are typically droplets of the active material enclosed in an inert porous shell which allows escape of the enclosed material to the surroundings at controlled rates. Encapsulated droplets are typically about 1 to 50 microns in diameter. The enclosed liquid typically constitutes about 50 to 95% of the weight of the capsule, and may include solvent in addition to the active compound. Encapsulated granules are generally porous granules with porous membranes sealing the granule pore openings, retaining the active species in liquid form inside the granule pores. Granules typically range from 1 millimeter to 1 centimeter, preferably 1 to 2 millimeters in diameter. Granules are formed by extrusion, agglomeration or prilling, or are naturally occurring. Examples of such materials are vermiculite, sintered clay, kaolin, attapulgite clay, sawdust and granular carbon. Shell or membrane materials include natural and synthetic rubbers, cellulosic materials, styrene-butadiene copolymers, polyacrylonitriles, polyacrylates, polyesters, polyamides, polyureas, polyurethanes and starch xanthates.

BSPR:
The metal chelates of the dione compounds are chemically stable in solid or dry form by themselves, but it is their chemical stability in the presence of water or another liquid medium or a co-herbicide which makes these chelates particularly useful in herbicidal formulations. As compared to the unchelated dione compounds, the metal chelates exhibit enhanced chemical stability in any liquid medium in which the parent dione compound is at least partially soluble. The metal chelates of the dione compounds of formula (I) are chemically stable in water, in other polar solvents such as dibutyl phthalate, in commonly used agriculturally acceptable solvents and carriers such as SOLVESSO 200, and in liquid agriculturally active ingredients such as acetochlor and other acetanilides, thiafluamide, butroxydim, esters of bromoxynil, MCPA, and 2,4-D, and the like.

BSPR:
Liquid formulations containing the chemically stable metal chelates of the herbicidal dione compounds of formula (I) can be applied directly to an area where control of undesired vegetation is located, using known techniques for

applying liquid or flowable herbicide formulations. The stable, liquid formulations containing an herbicidal metal chelate according to the invention can also be diluted to a desired concentration of active ingredient(s) prior to application, or can be tank-mixed with one or more additional herbicidal or other agricultural compositions. Specific examples of other herbicides which may be incorporated in an herbicidal formulation with the metal chelates according the invention include acetanilides, tralkoxydim, bromoxynil and its esters, thiafluamide, MCPA and its esters, 2,4-D and its esters, and fluroxypyr meptyl.

CLPR:
7. A chemically stable herbicidal composition according to claim 6, wherein said co-herbicide is selected from the group consisting of acetanilides, tralkoxydim, bromoxynil and its esters, thiafluamide, MCPA and its esters, 2,4-D and its esters, and fluroxypyr meptyl.

CLPR:
19. A dry, chemically stable herbicidal composition according to claim 18, wherein said co-herbicide is selected from the group consisting of acetanilides, tralkoxydim, bromoxynil and its esters, thiafluamide, MCPA and its esters, 2,4-D and its esters, and fluroxypyr meptyl.

L19: Entry 4 of 36 File: USPT Mar 2, 1999

DOCUMENT-IDENTIFIER: US 5876739 A
TITLE: Insecticidal seed coating

BSPR:
Still another object of the invention is to provide an insecticidal seed coating wherein the insecticide is encapsulated within a matrix that provides for the controlled release of the insecticide over a prolonged period of time.

BSPR:
The binder component of the coating is composed preferably of an adhesive polymer that may be natural or synthetic and is without phytotoxic effect on the seed to be coated. The binder may be selected from polyvinyl acetates, polyvinyl acetate copolymers (-ethylene), polyvinyl alcohols, polyvinyl alcohol copolymers, celluloses, including ethylcelluloses and methylcelluloses, hydroxymethylcelluloses, hydroxypropylcellulose, hydroxymethylpropylcelluloses, polyvinylpyrolidones, dextrins, maltodextrins, polysaccharides, fats, oils, proteins, gum arabics, shellacs, vinylidene chloride, vinylidene chloride copolymers, calcium lignosulfonates, acrylic copolymers, starches, polyvinylacrylates, zeins, gelatin, carboxymethylcellulose, chitosan, polyethylene oxide, acrylimide polymers and copolymers, polyhydroxyethyl acrylate, methylacrylimide monomers, alginate, ethylcellulose, polychloroprene and syrups or mixtures thereof. Preferred binders include polymers and copolymers of vinyl acetate, methyl cellulose, polyvinyl alcohol, vinylidene chloride, acrylic, cellulose, polyvinylpyrrolidone and polysaccharide. The above-identified polymers include those known in the art and for example some are identified as Rhoplex.TM. B-60A, Methocel.TM. A15LV, Methocel.TM. E15LV, Cellosize.TM. QP, AirFlex.TM. 500, Daratak.TM. SP 1090, Elvanol.TM. 85-30, Rhoplex.TM. AC-33-NP, Rhoplex.TM. B-85 and Vinamul.TM. 18132. Particularly preferred classes of polymers include polymers and copolymers of vinylidene chloride and vinyl acetate-ethylene copolymers.

BSPR:
The invention further contemplates the use of fillers, such as absorbent or inert fillers, in the insecticidal coating. It has been discovered that the use of fillers in the coating is particularly effective for protecting the seed during stress conditions. Fillers for such formulations are known in the art and may include woodflours, clays, activated carbon, sugars, diatomaceous earth, cereal flours, fine-grain inorganic solids, calcium carbonate and the like. Clays and inorganic solids which may be used include calcium bentonite, kaolin, china clay, talc, perlite, mica, vermiculite, silicas, quartz powder, montmorillonite and mixtures thereof. Sugars which may be used include dextrin and maltodextrin. Cereal flours include: wheat flour, oat flour and barley flour. Preferred fillers include diatomaceous earth, perlite, silica and calcium carbonates and mixtures thereof. For example, a product containing diatomaceous earth and amorphous silica such as that manufactured by Celite Corporation (Celite.TM.) is most preferred. One skilled in the art will appreciate that this is a non-exhaustive list of materials and that other recognized filler materials may be used depending on the seed to be coated and the insecticide used in the coating.

BSPR:
The filler is chosen so that it will provide a proper microclimate for the seed, for example the filler is used to increase the loading rate of the active ingredient and to adjust the control-release of the active ingredient. A filler aids in the production or process of coating the seed. The effect varies, because in some instances formulated insecticidal compounds will comprise a filler. The amount of filler used may vary, but generally the weight of the filler components will be in the range of about 0.005 to 70% of the seed weight, more preferably about 0.01 to 50% and most preferably about 0.1 to 15%. The filler may be

supplied in the coating of the invention with the insecticidal component. The specific examples as described herein utilize readily available commercial formulations of known insecticides wherein filler material is included in the formulation.

BSPR:
When the insecticidal component used for the coating is an oily type formulation and little or no filler is present, it may be necessary to hasten the drying process by drying the formulation. This optional procedure may be accomplished by means well known to those skilled in the art and includes the addition of calcium carbonate, kaolin or bentonite clay, perlite, diatomaceous earth or any adsorbent material added preferably concurrently with the insecticidal coating layer to absorb the oil or excess moisture. The amount of calcium carbonate or related compounds to dry charge the solution will be in the range of about 0.5 to 10.0% (w/w).

BSPR:
Film-forming compositions for enveloping coated seeds are well known in the art, and a film overcoating can be optionally applied to the coated seeds of the present invention. The film overcoat protects the coating layers and optionally allows for easy identification of the treated seeds. In general, additives are dissolved or dispersed in a liquid adhesive, usually a polymer into or with which seeds are dipped or sprayed before drying. Alternatively a powder adhesive can be used. Various materials are suitable for overcoating including but not limited to, methyl cellulose, hydroxypropylmethylcellulose, dextrin, gums, waxes, vegetable or paraffin oils; water soluble or water disperse polysaccharides and their derivatives such as alginates, starch, and cellulose; and synthetic polymers such as polyethylene oxide, polyvinyl alcohol and polyvinylpyrrolidone and their copolymers and related polymers and mixtures of these.

CLPR:
3. The coating of claim 1 wherein the filler is an absorbent filler selected from the group consisting of diatomaceous earth, perlite, silica, calcium carbonates, and mixtures thereof.

CLPV:
a) mixing a binder selected from vinyl acetate-ethylene copolymers or polymers or co-polymers of vinylidene chloride or mixtures thereof, and a filler selected from diatomaceous earth, perlite, silica, calcium carbonates and mixtures thereof, with a compound of formula II according to claim 9, terbufos, chlorpyrifos, tefluthrin, fipronil or tebupirimfos insecticide;

ORPL:
Hopkins Labels: 1979 Diazinon-Captan Seed Protectant, Bean Seed Protectant.

L19: Entry 17 of 36 File: USPT Jun 7, 1994

DOCUMENT-IDENTIFIER: US 5317834 A
TITLE: Agricultural processes and products

ABPL:
Methods for promoting the survivability and growth of seeds and seedlings which employ a fertilizer or a synergistic combination of a fertilizer and a moisture absorbing polymer which furnishes a reservoir of the moisture needed for plant growth and also provides a growth medium for soil bacteria relied upon to break down and release nitrogen from the fertilizer molecules. Systems for delivering these formulations and for verifying the delivery of the material.

BSPR:
One of these heretofore proposed techniques involves the use of a hygroscopic or moisture absorbent composition to retain moisture which is later released for uptake by the seeds of seedling. Specific, representative techniques of this character are described in U.S. Pat. Nos. 3,710,510 issued 16 Jan. 1973 to Tully et al. for PLANT GROWTH MEDIA AND METHODS and 4,540,427 issued 10 Sep. 1985 to Helbling for METHOD FOR IMPROVING WATER RETENTION PROPERTIES OF SOIL AND AN AGENT FOR PERFORMING THIS METHOD. This approach to promoting plant growth and survivability has the obvious, and significant, drawback that it does nothing to ensure that the plant nutrients needed for survivability and growth are made available to the seed or seedling being grown.

BSPR:
In one respect, this novel approach to the promotion of plant growth and survivability involves planting with the seed or seedling a urea-formaldehyde fertilizer or a fertilizer such as isobutyliedene diurea, crotonylidene urea, a sulfur coated urea, a resin coated, controlled release fertilizer such as Osmocote or Nutricote, a mixture of urea-formaldehyde fertilizers with different release rates, or a mixture of at least two of the foregoing.

BSPR:
Urea-formaldehyde fertilizers are characterized by specifications including insoluble nitrogen (CWIN) and activity index (AI). The first of these factors in indicative of the amount of nitrogen in the fertilizer that cannot be immediately dissolved, and activity index is an empirical value that reflects the rate at which the nitrogen in the more insoluble fractions of the urea-formaldehyde fertilizer will become available to the growing plant. By controlling the reactions between the urea and the formaldehyde, urea-formaldehydes with a targeted OWIN and AI and, therefore, a gradual, controlled release rate of plant available nitrogen over an extended period can be produced. Such fertilizers are commercially available at reasonable cost and in the solid forms employed in the present invention such as prills and granules. Other important advantages of urea-formaldehyde fertilizers, as far as the present invention is concerned, are its lack of volatility and its resistance to leaching.

BSPR:
Mixtures of hydrophilic, water absorbing gels and urea-formaldehyde fertilizers have heretofore been made available in the form of hard, dense tablets; and such tables (commonly known as fertilizer spikes and used to establish landscapes) are described in U.S. Pat. No. 4,055,974 issued 1 Nov. 1977 to Jackson, Jr. for DISINTEGRATABLE FERTILIZER TABLES. These tablets are, at best, of only limited utility because optimum conditions, including large amounts of ground moisture, are needed to disintegrate these tablets and release and thereby activate their constitutes at a rate which is compatible with the promotion of plant growth and survivability.

BSPR:

In another respect, the present invention relates to planting techniques utilizing bags or receptacles of the character described above and designed for both surface and subsurface planting in circumstances where supplementary moisture is not needed. In these circumstances--involving adequate rainfall and/or irrigation--the moisture absorber is not employed, and the receptacle will contain only plant nutrients as described above and such adjuncts and other constituents as may be desirable.

BSPR:
which employ a synergistic combination of an urea-formaldehyde or other, slow or controlled release nitrogen supplying fertilizer and a water absorbent composition to make nitrogen and moisture available to the plants being supported;

BSPR:
Yet another important and primary object of the invention is the provision of novel, improved delivery systems useful for both subsurface and above ground planting to supply plant nutrients with or without a moisture absorbing constituent.

DRPR:
FIGS. 3-6 are top views of the receptacle showing how it expands in a typical application of the invention as a moisture absorbent composition in the receptacle absorbs water and swells until it bursts open the receptacle and deposits the moisture containing composition and a source of plant nutrients around the roots of the seedling;

DEPR:
Each receptacle 22 will typically contain one to 25 parts by weight of urea-formaldehyde or comparable fertilizer to one part of moisture absorber and from 0.5 to 5 grams of the latter constituent. The exact ratio of fertilizer to moisture absorbing constituent is not critical, and a synergistic effect can be obtained at virtually any ratio.

DEPR:
Both constituents will typically be employed in granular form with the granules being approximately the same size. Because of this and the fact that the densities of the constituents are approximately the same, the constituents will tend to remain uniformly mixed, optimizing the useful properties of the formulation. Also, in applications such as reforestation, where shallow planting is employed, the lower amounts of moisture absorbing material will be employed so that this material will not swell to the extent that it might push the seedling out of the ground.

DEPR:
As will be apparent from the already provided, brief description of the present invention, one of the constituents in receptacle 22 in those applications of the invention in which the system is relied upon to supply moisture as well as nutrients is a hygroscopic composition which is: (1) capable of absorbing moisture from the surrounding soil 38 and thereby providing a reservoir of moisture, and (2) has a structure which can be penetrated by the fine, hairlike roots 40 of the developing seedling 30, thereby making that moisture available to the seedling during the active phase of its annual growth cycle. As moisture is absorbed by this constituent, receptacle 22 swells (compare FIG. 4 with FIG. 3) until the adhesive (not shown) bonding the side walls 34 and 36 of the receptacle together along one or more of the seams 42 between these side wall bursts (see FIG. 5). This spills the contents of receptacle 22 (see FIG. 6) in the vicinity of an onto the roots 40 of seedling 30 as is apparent from FIG. 2. This makes the nutrient and moisture supplying contents of the receptacle readily available to the seedling.

DEPR:
It was pointed out above that a urea-formaldehyde or other nitrogen supplying fertilizer or specified character is an essential component of the novel, plant growth promoting chemical systems disclosed herein and that a hygroscopic, moisture absorbing composition may be a second essential ingredient of those systems in many applications of the invention.

DEPR:
The preferred hygroscopic compositions are acrylamide and starch-acrylonitrile graft polymers. Suitable acrylamide polymers are disclosed in the above-cited

McKenzie, Helbling, and Cooke patients and marketed commercially by, among others, Industrial Service International, Inc., Bradenton, Fla., USA under the trade name Terrasorb-GB and by Broadleaf Industries, San Diego, Calif., USA under the designation P4.

DEPR:
Suitable starch-acrylonitrile graft polymers are described in U.S. Pat. No. 3,985,616 issued 12 Oct. 1976 to Weaver et al. for IMMOBILIZATION OF ENZYMES WITH A STARCH-GRAFT POLYMER and are available from Industrial Services International, Bradenson, Fla., USA under the trade name Terrasorb Original. These materials differ from the polyacrylamides employed in the practice of the present invention in that they breakdown in soil, typically after a period of about one year. Thus, in applications where a build-up in the soil of the moisture absorbing materials is undesirable, for example in growing plants in hanging baskets, these materials can be employed to advantage.

DEPR:
The preferred hygroscopic materials have the advantage of being able to absorb and subsequently release useful quantities of moisture--typically on the order of 300 to 500 by weight of the moisture absorbing composition; and this moisture is retained for very long periods of time, even in the dryest of soils. Furthermore, the most useful ones of these compositions have cells in which the moisture is stored; and the smaller, hairlike roots of a growing plant can readily penetrate the walls of these cells and avail the plant of the moisture they contain. Thus, adequate moisture to ensure establishment of a plant is made available for a very long period and in a format in which it is readily accessible to the growing plant.

DEPR:
Yet another advantage of employing polyacrylamide and starch-polyacrylonitrile graft polymers moisture absorbers is that these materials are capable of hosting mycorrhizae, thus making it feasible to inoculate nutrient/moisture supplying systems with microbes of that character. This is important because endomycorrhizae are known to form symbiotic associations with a majority of plant species; and they benefit host plants by causing more effective absorption of water and more effective utilization of nutrients, especially phosphorus.

DEPR:
Although polyacrylamide and starch-polyacrylonitrile graft polymers are far preferred because of their absorption capacities; their ability to so store moisture that it is readily available to a plant; and their ability to support microbial activity, it may not be essential that those particular moisture providing compositions be employed in all applications of the invention. Alternatives to consider include starch-based absorbents such as those described in Increased Plant Yield Potential from Water-Jelling Absorbent Has Grower, Landscape Applications, Pacific Coast Nurseryman and Garden Supply Dealer, February 1980, pp. 21 and 22.

DEPR:
While urea-formaldehydes are the fertilizers of choice in many cases, other slow and/or controlled release, nitrogen supplying materials may be employed instead without departing from the compass of the present invention. These include: isobutylidene diureas (IBDU); sulfur coated ureas, crotonylideneureas; and resin coated, controlled release fertilizer such as Osmocote (Sierra Chemical Co.) and Nutricote (Chisso Asahi Fertilizer Co., Toyko, Japan). Both contain mixtures of nitrogen, phosphorous, and potassium fertilizers in an envelope that expands and becomes porous to release its contents as the temperature of the soil in which the formulation is located increases. Conversely, as the weather cools, the coating shrinks and becomes less porous, inhibiting the release of, and conserving, the active ingredients of the fertilizer. Additional information on fertilizers of the character just described appears in Sierra Chemical Co. Bulletin 0787/MS/15M and in U.S. Pat. No. 3,223,518 issued 14 Dec. 1965 to Hansen for GRANULAR FERTILIZER HAVING A PLURALITY OF COATINGS AND THE PROCESS OF MAKING to which the reader may refer if he or she desires. Applications in which these alternatives to the preferred urea-formaldehyde fertilizers might be considered are those where soil microbes are lacking and moisture must be relied upon to decompose the fertilizer and release its nitrogen in plant available form and those where a plant's nutritional requirements cannot be met by a urea-formaldehyde fertilizer.

DEPR:

In actual trials, tomato plants established with a synergistic combination of a Sierra or Chisso Asahi, resin coated fertilizer and a polyacrylamide moisture absorber (P4) were much larger than those supplied with the fertilizer alone or the P4 polyacrylamide alone, and the fruit were more plentiful. Dahlias and annuals commonly employed in hanging baskets (petunias, impatiens, geranium, begonias, and fuschias) appeared healthier and had greener leaves and larger flowers. Pumpkins were larger and greener.

DEPR:
Starch-polyacrylonitrile graft polymers are preferred to polyacrylamides as moisture reservoirs in applications of the character just described to avoid build-up of this constituent in the soil in which the annual plants are grown.

DEPR:
A preferred formulation for promoting the growth of and establishing a transplanted annual contains 16 grams of Osmocote 14-14-14 (release time of 3-4 months) and 3 grams of a starch-polyacrylonitrile polymer such as Terrasorb Original.

DEPR:
The principles of the present invention may be employed to particular advantage in yet another exemplary application of the invention; viz., landscaping. In this application, a longer period of support of the plant is desirable. A preferred formulation for a transplanted, landscape plant, which allows this goal to be met, contains 1-3 grams of a polyacrylamide type moisture absorber, from 8 to 16 grams of a coated, controlled release fertilizer such as Sierra Chemical Co.'s Sierra 17-6-10 (which also contains trace elements), and from 16-24 grams of urea-formaldehyde fertilizer (Nitroform).

DEPR:
Resin coated, controlled release fertilizers can also be incorporated in formulations designed to be used in accord with the principles of the present invention and intended for silvicultural applications. A preferred formulation of this character includes 1-3 grams of polyacrylamide gel, 8-6 grams of one of the above coated, controlled release fertilizer such as Sierra Chemical Co.'s Sierra 17-6-10 plus trace elements, and 8-16 grams of Nitroform.

DEPR:
Heretofore, urea-formaldehyde fertilizers and or resin coated, controlled release fertilizers have not been employed in admixture as they are in the formulations described above because of separation problems and because of abrasion of the resin coating, which results in premature release of the active ingredients of the coated fertilizer. These problems are eliminated by the novel delivery system discussed above and illustrated in FIG. 1 which, as discussed above and at the same time, also makes it possible to deliver precise quantities of the active ingredients (nutrient or nutrient and moisture providing composition) to the plant supported by the formulation in accord with the principles of the present invention. Thus, delivery system 20 and others employing its novel principles eliminate an important either/or constraint on the use of fertilizers and solve a major application rate-related problem in the application of fertilizers to outplanted seedlings.

DEPR:
Formulations in accord with the principles of the present invention in which urea-formaldehyde is replaced by, or admixed with, an IBDU, sulfur coated urea, crotonylideneurea, and/or a resin coated, controlled release fertilizer such as one of those identified above differs from those employing only urea-formaldehyde(s) as a nitrogen source in that IBDUs, sulfur coated ureas, crotonylidene ureas, and resin coated, controlled release fertilizers are not broken down by microbial action. Nevertheless, the moisture supplying hygroscopic composition and the nutrient supply will still result in the formulation synergistically supporting the growth and establishment of the plant with which it is associated.

DEPR:
Other nutrients and adjuncts can be combined with the nitrogen supplying fertilizer(s) and the moisture absorbent material to optimize the formulation for different applications of the invention. These include compounds capable of providing potassium and phosphorous and thereby making a complete fertilizer available as well as sources of micronutrients. PG,27

DEPR:
The formulations disclosed herein, in addition to including optional constituents such as those identified in Table I-X, may be mixed with such conventional growth media as vermiculite, perlite, sand, sawdust, wood pulp, bark, peat, and top soil to provide a self-contained, plant growth mix.

DEPR:
Also, as discussed above, the moisture absorbing and reservoir providing constituent of the system can be eliminated in those applications of the invention where rainfall and/or irrigation supply adequate moisture.

DEPR:
As suggested above, pillows 46, 48, and 50 are planted by laying them on the surface of the ground. The hygroscopic material in the receptacle (for example, the receptacle 52 or pillow 46) absorbs moisture in a manner akin to that discussed above in conjunction with FIGS. 4 and 5, thereby making nutrients and moisture available to the seedling 67 sprouted from the germinated seed 58. Receptacle 52 is fabricated of a material that will allow moisture to penetrate to the interior of the bag and, also, allow the roots 68 of seedling 66 to penetrate through the receptacle into the ground.

DEPR:
Bursting of the bag is undesirable in these surface planting applications of the present invention employing pillows of the character just described and illustrated in FIGS. 7-9. Consequently, a less absorbent polyacrylamide or starch-acrylonitrile graft polymer and/or a stronger paper or cloth than employed in receptacle 22 may be employed to reduce the possibility of this happening.

DEPR:
As in the case of the delivery system 20 discussed above, the moisture absorbing constituent can be omitted from delivery systems 46 . . . 50 in those applications of the invention where rainfall and/or irrigation make this constituent unnecessary.

DEPR:
It was pointed out above that the novel plant nurturing techniques and systems disclosed herein are also readily adaptable to conventional tray- and bench-type seed germination processes and that, in such applications, the urea-formaldehyde and/or other fertilizer(s), a hygroscopic moisture absorber, and any optional plant nutrients, adjuncts, or other constituents that may be beneficial are mixed with the growing medium or incorporated in the material from which the seed germination containers are fabricated. Containers of this character and respectively intended for tray- and bench-type germination are illustrated in FIGS. 11 and 12, respectively, and identified by reference characters 84 and 88.

DEPR:
The fabrication of biodegradable plant containers from materials of the character discussed above except for the inclusion of plant nutrients and a hygroscopic polyacrylamide or starch-polyacrylonitrile graft polymer in accord with the principles of the present invention is described in detail in Kirk-Othmer, ENCYCLOPEDIA OF CHEMICAL TECHNOLOGY, SUPPLEMENT VOLUME, ALCOHOL FUELS TO TOXICOLOGY, Third Edition, John Wiley & Sons, New York, N.Y., USA, 1984, pp. 645-647. For that reason and because the details of the fabrication process are not part of the present invention, they will not be discussed herein.

DEPR:
The seedlings treated with the moisture absorbent along became very chlorortic from a lack of nutrients. Even though a second budbreak appeared, results were poor. The trees planted with Agriform tables only remained dormant, and growth did not occur during the growing season.

DETL:
Supplier/ Amount Constituent Function
Manufacturer (grams) Nitroform Nitrogen
Source Noram Chemical Co. 8 P4 Moisture Broadleaf Industries 3 Absorber Sierra
Inorganic Sierra Chemical Co. 16 Controlled Nitrogen, Release Potassium,
Fertilizer Phosphorous, and 17-6-10 Trace Elements Plus Minor

DETL:
TABLE II HERBICIDES

2,4-D 2,4,5-T 4,-CPA 2-(MCPP) 2-(3,4,-DP) 4-(2,4-DB) 4-(2,4,5-TB) 4-(4-CPB) 2,4,5-TES 2,4-DEB Dalapon DCV CDEA CIPC Barban Fenuron Monuron Diuron PCP DNAP 2,3,6-TBA NPA PMA HCA MH DCB Amitrole-T EXD Erbon CEPC EPTC DIPA CBMM CBDM BMM AMS SMDC Amiben *Simazine Ipazine Propazine Semetone Aratone Acrolein Banvel D Dipropalin Calcium Cyanamid Diphenylacetonitrile 3,4-dilchloropropionanilde Zytron MCPA Cacodylic acid 2-(2,4-DP) 3,4-DA 2-(4-CPP) Silvex 2-(3,4-DB) 4-(MCPB) MCPES Sesone 2,2,3-TPA TCA IPC CDAA CDEC BCPC Monuron TCA Fenuron TCA DNBP Neburon 2,3,5,6-TBA DNO KOCN Endothall TCB IPX OCH Amitrole PBA MAA EBEP CPPC CBFM DMA BDM CBM DMTT Dichlone Atrazine Fenac Chlorazine Trietazine Diquat Prometone Trifluralin 2,4-DEP Bandane Betazan *Dacthal p-dichlorobenzene Chlordane Lorox

CLPR:
1. A method of promoting the growth of a seedling which comprises the steps of: locating in physical proximity to said seedling or a seed from which the seedling can be grown, and in intimate association therewith, the combination of a nitrogen supplying fertilizer which is degradable by microbial action and a moisture absorbent composition which is effective to: supply moisture to said seed or seedling and promote the growth of soil microbes that are capable of converting the nitrogen in said fertilizer to a plant available form; and

CLPR:
2. A method of promoting the growth of a seedling which comprises the step of locating, in physical proximity to said seedling or a seed from which the seedling can be grown, and in intimate association therewith, the combination of a nitrogen supplying fertilizer which is degradable by microbial action and a moisture absorbent composition which is effective to: supply moisture to said seed or seedling and promote the growth of soil microbes that are capable of converting the nitrogen in said fertilizer to a plant available form, said fertilizer containing a mixture of urea-formaldehyde and the CWIN and the activity index of each urea-formaldehyde being so adjusted that the urea-formaldehydes are degradable at different rates by microbial action and nitrogen is thereby made available to said seedling over an extended period of time which may span more than one growing season.

CLPR:
7. A method of promoting the growth of a seedling which comprises the steps of: locating in close physical proximity to the seedling or a seed which can be germinated to provide said seedling a sealed receptacle which is fabricated from a porous material and which contains, in loose form, a source of plant nutrients and a moisture absorbing composition which is thereafter, and upon the migration of moisture into the receptacle through said porus material and absorption of said moisture: effective to burst said receptacle and release the plant nutrient source and the moisture absorbing composition therefrom and in the vicinity of the seed or seedling;

CLPR:
8. A method of promoting the growth of a seedling which comprises the steps of: locating in close physical proximity to the seedling or a seed which can be germinated to provide said seedling a receptacle which contains a source of plant nutrients and a moisture absorbing composition which is thereafter, and upon the absorption of moisture: effective to burst said receptacle and release the plant nutrient source and the moisture absorbing composition therefrom and in the vicinity of the seed or seedling, said source of plant nutrients being or containing a mixture of urea-formaldehydes, the CWIN and the activity index of each urea-formaldehyde being so adjusted that the urea-formaldehydes are degradable at different rates by microbial action and nitrogen is thereby made available to said seedling over an extended period of time which may span more than one growing season.

CLPL:
nutrient and a moisture absorbing composition with at least one microbe which is symbiotic with, and capable of benefiting the seedling by, promoting the uptake of moisture and the utilization of nutrients by the seedling.

CLPV:
inoculating the combination of the nitrogen supplying fertilizer and the moisture absorbing composition with at least one microbe which is symbiotic with, and capable of benefiting the seedling by, promoting the uptake of moisture and the utilization of nutrients by the seedlings.

CLPV:
which comprises the step of locating, in physical proximity to said seedling or a seed from which the seedling can be grown, and in intimate association therewith, the combination of a nitrogen supplying fertilizer which is degradable by microbial action and a moisture absorbent composition which is effective to: supply moisture to said seed or seedling and promote the growth of soil microbes that are capable of converting the nitrogen in said fertilizer to a plant available form;

CLPV:
said nitrogen supplying fertilizer and said moisture absorbing composition being provided, in loose form, in a sealed receptacle which is fabricated from a porous material and which can be burst by the migration of moisture into the container through the porous material, the absorption of moisture by said moisture absorbent composition, and the subsequent swelling of said composition to thereby release said nitrogen supplying fertilizer and said moisture absorbent composition from said receptacle in the vicinity of the seed or the roots of the seedling; and

CLPV:
said first composition and said second composition being provided, in loose form, in a sealed receptacle which is fabricated from a porous material and which can be burst by migration of moisture into the receptacle through said porous material, the absorption of moisture by said moisture absorbent composition, and the subsequent swelling of said composition to thereby release said nutrients and said moisture absorbent composition from said receptacle in the vicinity of or on said seed or the roots of said seedling; and

CLPV:
locating in close physical proximity to the seedling or a seed which can be germinated to provide said seedling a receptacle which contains a source of plant nutrients and a moisture absorbing composition which is thereafter, and upon the absorption of moisture: effective to burst said receptacle and release the plant nutrient source and the moisture absorbing composition therefrom and in the vicinity of the seed or seedling; and

CLPV:
inoculating the combination of said source of plant nutrients and said moisture absorbing composition with at least one microbe which is symbiotic with, and capable of benefiting the seedling by, promoting the uptake of moisture and the utilization of nutrients by the seedling.

CLPV:
controlled release fertilizer, or

CLPV:
controlled release fertilizer, or

CLPV:
controlled release fertilizer, or

CLPW:
(ii) is capable of absorbing moisture and thereby becoming a source of moisture which is available to the seedling over an extended period of time;

WEST

Generate Collection

L19: Entry 27 of 36 File: USPT Jun 11, 1991

DOCUMENT-IDENTIFIER: US 5022182 A
TITLE: Agricultural processes and products

ABPL:
Methods of promoting the survivability and growth of seeds and seedlings which employ a fertilizer or a synergistic combination of a fertilizer and a moisture absorbing polymer which furnishes a reservoir of the moisture needed for plant growth and also provides a growth medium for soil bacteria relied upon to break down and release nitrogen from the fertilizer molecules. Systems for delivering these formulations and for verifying the delivery of the material.

BSPR:
One of these heretofore proposed techniques involves the use of a hygroscopic or moisture absorbent composition to retain moisture which is later released for uptake by the seed or seedling. Specific, representative techniques of this character are described in U.S. Pat. Nos.: 3,710,510 issued Jan. 16, 1973 to Tully et al. for PLANT GROWTH MEDIA AND METHODS and 4,540,427 issued Sept. 10, 1985 to Helbling for METHOD FOR IMPROVING WATER RETENTION PROPERTIES OF SOIL AND AN AGENT FOR PERFORMING THIS METHOD. This approach to promoting plant growth and survivability has the obvious, and significant, drawback that it does nothing to ensure that the plant nutrients needed for survivability and growth are made available to the seed or seedling being grown.

BSPR:
In one respect, this novel approach to the promotion of plant growth and survivability involves planting with the seed or seedling a urea-formaldehyde fertilizer or a fertilizer such as isobutyliedene diurea, crotonylidene urea, a sulfur coated urea, a resin coated, controlled release fertilizer such as Osmocote or Nutricote, a mixture of urea-formaldehyde fertilizers with different release rates, or a mixture of at least two of the foregoing.

BSPR:
Urea-formaldehyde fertilizers are characterized by specifications including insoluble nitrogen (OWIN) and activity index (AI). The first of these factors is indicative of the amount of nitrogen in the fertilizer that cannot be immediately dissolved, and activity index is an empirical value that reflects the rate at which the nitrogen in the more insoluble fractions of the urea-formaldehyde fertilizer will become available to the growing plant. By controlling the reactions between the urea and the formaldehyde, urea-formaldehydes with a targeted OWIN and AI and, therefore, a gradual, controlled release rate of plant available nitrogen over an extended period can be produced. Such fertilizers are commercially available at reasonable cost and in the solid forms employed in the present invention such as prills and granules. Other important advantages of urea-formaldehyde fertilizers, as far as the present invention is concerned, are its lack of volatility and its resistance to leaching.

BSPR:
Mixtures of hydrophilic, water absorbing gels and urea-formaldehyde fertilizers have heretofore been made available in the form of hard, dense tablets; and such tablets (commonly known as fertilizer spikes and used to establish landscapes) are described in U.S. Pat. No. 4,055,974 issued 1 Nov. 1977 to Jackson, Jr. for DISINTEGRATABLE FERTILIZER TABLETS. These tablets are, at best, of only limited utility because optimum conditions, including large amounts of ground moisture, are needed to disintegrate these tablets and release and thereby activate their constituents at a rate which is compatible with the promotion of plant growth and survivability.

BSPR:

In another respect, the present invention relates to planting techniques utilizing bags or receptacles of the character described above and designed for both surface and subsurface planting in circumstances where supplementary moisture is not needed. In these circumstances--involving adequate rainfall and/or irrigation--the moisture absorber is not employed, and the receptacle will contain only plant nutrients as described above and such adjuncts and other constituents as may be desirable.

BSPR:
which employ a synergistic combination of an urea-formaldehyde or other, slow or controlled release nitrogen supplying fertilizer and a water absorbent composition to make nitrogen and moisture available to the plants being supported;

BSPR:
Yet another important and primary object of the invention is the provision of novel, improved delivery systems useful for both subsurface and above ground planting to supply plant nutrients with or without a moisture absorbing constituent.

DRPR:
FIGS. 3-6 are top views of the receptacle showing how it expands in a typical application of the invention as a moisture absorbent composition in the receptacle absorbs water and swells until it bursts open the receptacle and deposits the moisture containing composition and a source of plant nutrients around the roots of the seedling;

DEPR:
Each receptacle 22 will typically contain one to 25 parts by weight of urea-formaldehyde or comparable fertilizer to one part of moisture absorber and from 0.5 to 5 grams of the latter constituent. The exact ratio of fertilizer to moisture absorbing constituent is not critical, and a synergistic effect can be obtained at virtually any ratio.

DEPR:
Both constituents will typically be employed in granular form with the granules being approximately the same size. Because of this and the fact that the densities of the constituents are approximately the same, the constituents will tend to remain uniformly mixed, optimizing the useful properties of the formulation. Also, in applications such as reforestation, where shallow planting is employed, the lower amounts of moisture absorbing material will be employed so that this material will not swell to the extent that it might push the seedling out of the ground.

DEPR:
As will be apparent from the already provided, brief description of the present invention, one of the constituents in receptacle 22 in those applications of the invention in which the system is relied upon to supply moisture as well as nutrients is a hygroscopic composition which is: (1) capable of absorbing moisture from the surrounding soil 38 and thereby providing a reservoir of moisture, and (2) has a structure which can be penetrated by the fine, hairlike roots 40 of the developing seedling 30, thereby making that moisture available to the seedling during the active phase of its annual growth cycle. As moisture is absorbed by this constituent, receptacle 22 swells (compare FIG. 4 with FIG. 3) until the adhesive (not shown) bonding the side walls 34 and 36 of the receptacle together along one or more of the seams 42 between these side wall bursts (see FIG. 5). This spills the contents of receptacle 22 (see FIG. 6) in the vicinity of and onto the roots 40 of seedling 30 as is apparent from FIG. 2. This makes the nutrient and moisture supplying contents of the receptacle readily available to the seedling.

DEPR:
It was pointed out above that a urea-formaldehyde or other nitrogen supplying fertilizer of specified character is an essential component of the novel, plant growth promoting chemical systems disclosed herein and that a hygroscopic, moisture absorbing composition may be a second essential ingredient of those systems in many applications of the invention.

DEPR:
The preferred hygroscopic compositions are acrylamide and starch-acrylonitrile graft polymers. Suitable acrylamide polymers are disclosed in the above-cited

McKenzie, Helbling, and Cooke patents and marketed commercially by, among others, Industrial Service International, Inc., Bradenton, Fla., USA under the trade name Terrasorb-GB and by Broadleaf Industries, San Diego, Calif., USA under the designation P4.

DEPR:
Suitable starch-acrylonitrile graft polymers are described in U.S. Pat. No. 3,985,616 issued 12 Oct. 1976 to Weaver et al. for IMMOBILIZATION OF ENZYMES WITH A STARCH-GRAFT POLYMER and are available from Industrial Services International, Bradenson, Fla., USA under the trade name Terrasorb Original. These materials differ from the polyacrylamides employed in the practice of the present invention in that they break down in soil, typically after a period of about one year. Thus, in applications where a build-up in the soil of the moisture absorbing materials is undesirable, for example in growing plants in hanging baskets, these materials can be employed to advantage.

DEPR:
The preferred hygroscopic materials have the advantage of being able to absorb and subsequently release useful quantities of moisture--typically on the order of 300 to 500 by weight of the moisture absorbing composition; and this moisture is retained for very long periods of time, even in the dryest of soils. Furthermore, the most useful ones of these compositions have cells in which the moisture is stored; and the smaller, hairlike roots of a growing plant can readily penetrate the walls of these cells and avail the plant of the moisture they contain. Thus, adequate moisture to ensure establishment of a plant is made available for a very long period and in a format in which it is readily accessible to the growing plant.

DEPR:
Yet another advantage of employing polyacrylamide and starch-polyacrylonitrile graft polymers moisture absorbers is that these materials are capable of hosting mycorrhizae, thus making it feasible to inoculate nutrient/moisture supplying systems with microbes of that character. This is important because endomycorrhizae are known to form symbiotic associations with a majority of plant species; and they benefit host plants by causing more effective absorption of water and more effective utilization of nutrients, especially phosphorus.

DEPR:
Although polyacrylamide and starch-polyacrylonitrile graft polymers are far preferred because of their absorption capacities; their ability to so store moisture that it is readily available to a plant; and their ability to support microbial activity, it may not be essential that those particular moisture providing compositions be employed in all applications of the invention. Alternatives to consider include starch-based absorbents such as those described in Increased Plant Yield Potential from Water-Jelling Absorbent Has Grower, Landscape Applications, Pacific Coast Nurseryman and Garden Supply Dealer, February 1980, pp. 21 and 22.

DEPR:
While urea-formaldehydes are the fertilizers of choice in many cases, other slow and/or controlled release, nitrogen supplying materials may be employed instead without departing from the compass of the present invention. These include: isobutylidene diureas (IBDU); sulfur coated ureas, crotonylideneureas; and resin coated, controlled release fertilizer such as Osmocote (Sierra Chemical Co.) and Nutricote (Chisso Asahi Fertilizer Co., Toyko, Japan). Both contain mixtures of nitrogen, phosphorous, and potassium fertilizers in an envelope that expands and becomes porous to release its contents as the temperature of the soil in which the formulation is located increases. Conversely, as the weather cools, the coating shrinks and becomes less porous, inhibiting the release of, and conserving, the active ingredients of the fertilizer. Additional information on fertilizers of the character just described appears in Sierra Chemical Co. Bulletin 0787/MS/15M and in U.S. Pat. No. 3,223,518 issued 14 Dec. 1965 to Hansen for GRANULAR FERTILIZER HAVING A PLURALITY OF COATINGS AND THE PROCESS OF MAKING to which the reader may refer if he or she desires. Applications in which these alternatives to the preferred urea-formaldehyde fertilizers might be considered are those where soil microbes are lacking and moisture must be relied upon to decompose the fertilizer and release its nitrogen in plant available form and those where a plant's nutritional requirements cannot be met by a urea-formaldehyde fertilizer.

DEPR:

In actual trials, tomato plants established with a synergistic combination of a Sierra or Chisso Asahi, resin coated fertilizer and a polyacrylamide moisture absorber (P4) were much larger than those supplied with the fertilizer alone or the P4 polyacrylamide alone, and the fruit were more plentiful. Dahlias and annuals commonly employed in hanging baskets (petunias, impatiens, geraniums, begonias, and fuschias) appeared healthier and had greener leaves and larger flowers. Pumpkins were larger and greener.

DEPR:
Starch-polyacrylonitrile graft polymers are preferred to polyacrylamides as moisture reservoirs in applications of the character just described to avoid build-up of this constituent in the soil in which the annual plants are grown.

DEPR:
A preferred formulation for promoting the growth of and establishing a transplanted annual contains 16 grams of Osmocote 14-14-14 (release time of 3-4 months) and 3 grams of a starch-polyacrylonitrile polymer such as Terrasorb Original.

DEPR:
The principles of the present invention may be employed to particular advantage in yet another exemplary application of the invention; viz., landscaping. In this application, a longer period of support of the plant is desirable. A preferred formulation for a transplanted, landscape plant, which allows this goal to be met, contains 1-3 grams of a polyacrylamide type moisture absorber, from 8 to 16 grams of a coated, controlled release fertilizer such as Sierra Chemicals Co.'s Sierra 17-6-10 (which also contains trace elements), and from 16-24 grams of urea-formaldehyde fertilizer (Nitroform).

DEPR:
Resin coated, controlled release fertilizers can also be incorporated in formulations designed to be used in accord with the principles of the present invention and intended for silvicultural applications. A preferred formulation of this character includes 1-3 grams of polyacrylamide gel, 8-16 grams of one of the above coated, controlled release fertilizer such as Sierra Chemical Co.'s Sierra 17-6-10 plus trace elements, and 8-16 grams of Nitroform.

DEPR:
Heretofore, urea-formaldehyde fertilizers and or resin coated, controlled release fertilizers have not been employed in admixture as they are in the formulations described above because of separation problems and because of abrasion of the resin coating, which results in premature release of the active ingredients of the coated fertilizer. These problems are eliminated by the novel delivery system discussed above and illustrated in FIG. 1 which, as discussed above and at the same time, also makes it possible to deliver precise quantities of the active ingredients (nutrient or nutrient and moisture providing composition) to the plant supported by the formulation in accord with the principles of the present invention. Thus, delivery system 20 and others employing its novel principles eliminate an important either/or constraint on the use of fertilizers and solve a major application rate-related problem in the application of fertilizers to outplanted seedlings.

DEPR:
Formulations in accord with the principles of the present invention in which urea-formaldehyde is replaced by, or admixed with, an IBDU, sulfur coated urea, crotonylideneurea, and/or a resin coated, controlled release fertilizer such as one of those identified above differs from those employing only urea-formaldehyde(s) as a nitrogen source in that IBDUs, sulfur coated ureas, crotonylidene ureas, and resin coated, controlled release fertilizers are not broken down by microbial action. Nevertheless, the moisture supplying hygroscopic composition and the nutrient supply will still result in the formulation synergistically supporting the growth and establishment of the plant with which it is associated.

DEPR:
Other nutrients and adjuncts can be combined with the nitrogen supplying fertilizer(s) and the moisture absorbent material to optimize the formulation for different applications of the invention. These include compounds capable of providing potassium and phosphorous and thereby making a complete fertilizer available as well as sources of micronutrients.

DEPR:
The formulations disclosed herein, in addition to including optional constituents such as those identified in Tables I-X, may be mixed with with such conventional growth media as vermiculite, perlite, sand, sawdust, wood pulp, bark, peat, and top soil to provide a self-contained, plant growth mix.

DEPR:
Also, as discussed above, the moisture absorbing and reservoir providing constituent of the system can be eliminated in those applications of the invention where rainfall and/or irrigation supply adequate moisture.

DEPR:
As suggested above, pillows 46, 48, and 50 are planted by laying them on the surface of the ground. The hygroscopic material in the receptacle (for example, the receptacle 52 of pillow 46) absorbs moisture in a manner akin to that discussed above in conjunction with FIGS. 4 and 5, thereby making nutrients and moisture available to the seedling 67 sprouted from the germinated seed 58. Receptacle 52 is fabricated of a material that will allow moisture to penetrate to the interior of the bag and, also, allow the roots 68 of seedling 66 to penetrate through the receptacle into the ground.

DEPR:
Bursting of the bag is undesirable in these surface planting applications of the present invention employing pillows of the character just described and illustrated in FIGS. 7-9. Consequently, a less absorbent polyacrylamide or starch-acrylonitrile graft polymer and/or a stronger paper or clothe than employed in receptacle 22 may be employed to reduce the possibility of this happening.

DEPR:
As in the case of the delivery system 20 discussed above, the moisture absorbing constituent can be omitted from delivery systems 46 . . . 50 in those applications of the invention where rainfall and/or irrigation make this constituent unnecessary.

DEPR:
It was pointed out above that the novel plant nurturing techniques and systems disclosed herein are also readily adaptable to conventional tray- and bench-type seed germination processes and that, in such application, the urea-formaldehyde and/or other fertilizer(s), a hygroscopic moisture absorber, and any optional plant nutrients, adjuncts, or other constituents that may be beneficial are mixed with the growing medium or incorporated in the material from which the seed germination containers are fabricated. Containers of this character and respectively intended for tray- and bench-type germination are illustrated in FIGS. 11 and 12, respectively, and identified by reference characters 84 and 88.

DEPR:
The fabrication of biodegradable plant containers from materials of the character discussed above except for the inclusion of plant nutrients and a hygroscopic polyacrylamide or starch-polyacrylonitrile graft polymer in accord with the principles of the present invention is described in detail in Kirk-Othmer, ENCYCLOPEDIA OF CHEMICAL TECHNOLOGY, SUPPLEMENT VOLUME, ALCOHOL FUELS TO TOXICOLOGY, Third Edition, John Wiley & Sons, New York, N.Y., USA, 1984, pp. 645-647. For that reason and because the details of the fabrication process are not part of the present invention, they will not be discussed herein.

DEPR:
The seedlings treated with the moisture absorbent alone became very chlorortic from a lack of nutrients. Even though a second budbreak appeared, results were poor. The trees planted with Agriform tablets only remained dormant, and growth did not occur during the growing season.

DETL:

Supplier/ Manufacturer	Amount (grams)	Constituent	Function
Source Noram Chemical Co.	8	P4 Moisture Absorber	Broadleaf Industries 3 Nitroform Nitrogen Sierra Inorganic Sierra Chemical Co. 16 Controlled Release Potassium, Fertilizer Phosphorous, and 17-6-10 Trace Elements Plus Minor

DETL:

TABLE II HERBICIDES

2,4-D 2,4,5-T 4-CPA 2-(MCPP) 2-(3,4,-DP) 4-(2,4-DB) 4-(2,4,5-TB) 4-(4-CPB) 2,4,5-TES 2,4-DEB Dalapon DCV CDEA CIPC Barban Fenuron Monuron Diuron PCP DNAP 2,3,6-TBA NPA PMA HCA MH DCB Amitrole-T EXD Erbon CEPC EPTC DIPA CBMM CBDM BMM AMS SMDC Amiben *Simazine Ipazine Propazine Semetone Aratone Acrolein Banvel D Dipropalin Calcium Cyanamid Diphenylacetonitrile 3,4-dilchloropropionanilde Zytron MCPA Cacodylic acid 2-(2,4-DP) 3,4-DA 2-(4-CPP) Silvex 2-(3,4-DB) 4-(MCPB) MCPES Sesone 2,2,3-TPA TCA IPC CDAA CDEC BCPC Monuron TCA Fenuron TCA DNBP Neburon 2,3,5,6-TBA DNO KOCN Endothall TCB IPX OCH Amitrole PBA MAA EBEP CPPC CBFM DMA BDM CBM DMTT Dichlone Atrazine Fenac Chlorazine Trietazine Diquat Prometone Trifluralin 2,4-DEP Bandane Betazan *Dacthal p-dichlorobenzene Chlordane Lorox

CLPR:
1. A system for making nutrients and moisture available to seedlings, said system comprising: a receptacle composed of a material that is permeable to water, a plant nutrient source in said receptacle, said receptacle having a burst strength and a moisture absorbing composition in said receptacle, the burst strength of said receptacle and the amount and absorptivity of said moisture absorbing composition being so related that the absorption by said composition of an effective amount of moisture will result in said receptacle rupturing and releasing said plant nutrients and said moisture absorbing composition to a seed or seedling.

CLPR:
2. A system as defined in claim 1 in which the plant nutrient source is one which is degradable by microbial action to make the nutrient available to the seedling and in which the moisture absorbing composition is one which is capable of promoting degradation of said first composition by said microbial action during those periods in which the seedling is capable of growth and of inhibiting such degradation during those periods when the seedling is dormant.

CLPR:
4. A system as defined in claim 1 in which the moisture absorbing composition is a polyacrylamide or a starch-polyacrylonitrile graft polymer.

L19: Entry 33 of 36 File: USPT May 8, 1990

DOCUMENT-IDENTIFIER: US 4923506 A
TITLE: Polyhydroxy polymer delivery systems

ABPL:
A controlled release composition of biologically active materials is prepared by reacting a biologically active agent, aqueous polyhydroxy polymer, inorganic salt, and optional filler(s), drying the product and then grinding the product to the desire particle size. The product is then used, for example, for controlling pests.

BSPR:
This invention relates to compositions for controlled release of biologically active materials. More specifically, it relates to polyhydroxy polymer/salt compositions with biologically active materials contained within a matrix.

BSPR:
U.S. Pat. No. 4,382,813 describes the coagulation or precipitation of an entrapped pesticidal agent by the rapid insolubilization of a starch alkoxide containing material with a bivalent cation selected from the group of calcium, barium, and strontium. These systems are limited to materials having low solubility in water and result in a strongly basic matrix and are not applicable to alkali sensitive materials.

BSPR:
The present invention is directed to a granular or powder, slow release (or controlled release) matrix-carried biologically active agent prepared by emulsifying or dispersing a biologically active agent, optionally on a filler/inorganic salt, in an aqueous polyhydroxy polymer system selected from the group consisting of polyvinyl alcohols, unmodified, modified and substituted starches, dextrins, natural gums, cellulose derivatives and mixtures thereof, optionally adding a filler, and/or an inorganic salt while thoroughly mixing, drying the product and grinding the dried product to the desired particle size.

BSPR:
If the salt and concentration are such that coagulation of the polyhydroxy polymer results, a distinct aqueous phase develops which is separated by decantation, filtration or centrifugation. The precipitate contains part of the inorganic salt and other materials soluble in the brine, and most of the water insoluble organic materials present in the reaction mixture (solvents, active ingredient, etc.). Obviously, if the absorbing power of the coagulated product exceeds the amount of water present in the reaction mixture, all brine is retained in the coagulate. In either case the residual water is removed by drying at ambient and/or elevated temperature (usually .about. 75.degree. C.). If necessary, the dried product is ground and classified to the desired particle size.

BSPR:
In the preparation of the composition of the present invention from commercial starch, first, the starch is heated with hot water to form a thick paste. The paste formation step can be carried out at temperatures of 60-100.degree. C. without special equipment. The ratio of starch to water can be varied from 1:2 to 1:12 without apparent effect on the product. The biological agent to be delivered can be added to the hot paste which is convenient when working with low melting solids or the paste can be cooled to near room temperature where volatile or heat sensitive materials are involved. The biological agent is blended with this paste to form a uniform mixture which, in most cases, can be allowed to stand for some time without separation. Coprecipitation of the matrix is brought about by the addition of the salt. The amount of salt used can be varied from 10 grams to 30

grams per 100 grams of water.

BSPR:
A variety of water soluble/swellable polyhydroxy polymers can be used for the present invention. Included are various polyvinyl alcohols, starches (unmodified, modified and substituted types), dextrins, natural gums, cellulose derivatives, etc.

BSPR:
Examples of the polyhydroxy polymers are the various partially or fully hydrolyzed polyvinyl acetates sold as polyvinyl alcohols in various molecular weight ranges, corn starch, oxidized starch, acid modified starch, hydroxyethyl starch, cyanoethyl starch, gum arabic, methyl cellulose, hydroxyethyl cellulose, hydroxypropyl cellulose, methylhydroxyethyl cellulose, etc.

BSPR:
With respect to optional fillers, a large variety of powdered or granular materials can be employed. Examples are diatomites, attapulgites, bentonites, talcs, montmorillonites, perlites, vermiculites, corn cob grits, wood flour, lignin sulfonates, etc.

BSPR:
The matrices of the present invention can be used for the delivery of insecticides, acaricides, herbicides, fungicides, nematocides, bactericides, rodenticides, fumigants, animal repellents, insect repellents, plant growth regulators, fertilizers, pheromones, sex lures, flavors, odors, drugs, diet supplements, and biological insect control agents. Typical insectides are, e.g., methyl parathion, parathion, ethoprop, fonofos, fenitrothion, chlorpyrifos, diazinon, phorate, etc., which can be used undiluted, in the form of suited solutions or emulsifiable concentrates, on fillers or salts, or in combinations. Typical herbicides include endothall, trifluralin, 2,4-D, monuron, dicamba, atrazine, alachlor, butylate and EPTC.

DEPR:
Six grams of technical methyl parathion were blended with 60 grams of a 33% aqueous paste of hydroxyethyl starch [prepared by heating 20.0 grams of Clineo 716D (Clinton Corn Processing Co.) and 40.0 grams water for 15 minutes at 80-90.degree. C., and cooling the mixture to ambient temperature]. Then 8.5 grams of finely ground Al.sub.2 (SO.sub.4).sub.3.18H.sub.2 0 were added incrementally with stirring. After one hour the coagulated product was separated by filtration and dried for one day at ambient temperature and then 21/2hours at 75.degree. C. The product was ground in a blender and classified to 14-40 mesh size. It analyzed for 11.1% of active ingredient.

DEPR:
In an experiment similar to Example 6, but substituting 10.0 grams of a 20% aqueous solution of oxidized starch (sold under the trademark Clinco 370D by Clinton Corn Processing Company) for the gum arabic, a granulate containing 16.3% of active ingredient was obtained.

DEPR:
In an experiment similar to Example 6 but substituting 10.0 grams of a 20% aqueous solution of cyanoethyl starch (Clinisize 756B, Clinton Corn Processing Company) for the gum arabic, a granulate containing 16.6% of active ingredient was obtained.

DEPR:
In an experiment similar to Example 6 but substituting 10.0 grams of a 20% aqueous solution of hydroxyethyl starch (Clineo 716D) for the gum arabic, a granulate containing 16.3% of active ingredient was obtained.

DEPR:
A paste formed by heating 16 grams of starch (Corn Products Co.) and 5 grams of Vinol 205 in 100 ml of water at 70-80.degree. C., was blended with 3.2 grams of trifluralin. On the addition and dissolution of 30 grams of anhydrous sodium sulfate, the starch coagulated to give a precipitate which was collected by filtration and dried. The product (27.1 grams) analyzed for 7.6% of trifluralin.

DEPR:
Using the procedure given in Example 12 but substituting 3 grams of Vinol 425 (Air Products) for the Vinol 205, 5 grams of trifluralin was entrapped in a

starch matrix to give 31 grams of product which analyzed for 15.1% of trifluralin.

DEPR:
A paste was formed by heating 16 grams of starch in 100 ml of water at 70-80.degree. C. This paste was allowed to cool slightly and 4.5 grams of technical chlorpyrifos was blended in until a uniform paste was obtained. On addition and dissolution of 20 grams of anhydrous sodium sulfate the starch coagulated to give a filterable solid. This product (20 grams) was dried, ground and sieved to a uniform particle size. The sample analyzed for 11.6% of chlorpyrifos.

DEPR:
Using the procedure given in Example 15, 5 grams of methyl parathion was entrapped in a starch matrix to give 20.9 grams of product which analyzed for 11.8% of methyl parathion.

DEPR:
Using the procedure given in Example 15, 5 grams of diazinon was entrapped in a starch matrix to give 29.2 grams of product which analyzed for 12.2% of diazinon.

DEPR:
Using the procedure given in Example 15, 5 grams of diazinon was entrapped using 30 grams of sodium sulfate to give 26.9 grams of product which analyzed for of 13.8% diazinon.

DEPR:
Using the procedure given in Example 15, but substituting magnesium sulfate for the sodium sulfate, 5 grams of diazinon was entrapped to give 24.1 grams of product which analyzed for 15.3% of diazinon.

DEPR:
Using the procedure given in Example 15 but substituting sodium meta phosphate for the sodium sulfate, 5 grams of diazinon was entrapped to give 24.8 grams of product which analyzed for 14.5% of diazinon.

CLPR:
1. A process for making a controlled release biologically active composition which consists essentially of emulsifying/dispersing a pesticide, optionally on an inert filler, in an aqueous polyhydroxy polymer system wherein said polymer is an unmodified starch, adding a water soluble alkali metal or magnesium and an optional inert filler while thoroughly mixing to precipitate a product, drying the precipitated product, and reducing the product to the desired particle size.

CLPR:
2. A process for making a controlled release biologically active composition which consists essentially of emulsifying/dispersing a pesticide, on or together with a water soluble alkali metal or magnesium sulfate plus an optional inert filler in an aqueous polyhydroxy polymer system wherein the polymer is an unmodified starch, drying the product after precipitation from the emulsion/dispersion, and reducing the product to the desired particle size.

CLPR:
3. A process for making a controlled release biologically active composition consisting essentially of emulsifying/dispersing a pesticide, on or together with a water soluble alkali metal or magnesium sulfate plus an optional inert filler, in an aqueous polyhydroxy polymer system wherein said polymer is an unmodified starch, adding another portion of the water soluble alkali metal or magnesium sulfate and an optional inert filler while thoroughly mixing to thereby precipitate said composition, drying the product, and reducing the product to the desired particle size.

CLPR:
4. A process for preparing a controlled release composition of a pesticide contained in a matrix of a water soluble/swellable polymer system, a water soluble alkali metal or magnesium sulfate and an optional filler(s), said process consisting essentially of precipitating said composition from an aqueous emulsion/dispersion of an essentially water insoluble pesticide in a hydrophilic polymer, wherein said polymer is an unmodified starch, by the addition of a water soluble alkali metal or magnesium sulfate, drying the precipitate, and reducing

it to the desired particle size.

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End of Result Set

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L19: Entry 36 of 36 File: USPT Apr 14, 1987

DOCUMENT-IDENTIFIER: US 4657582 A
TITLE: Polyhydroxy polymer delivery systems

BSPR:
This invention relates to a method of preparing a composition for controlled release of active materials. More specifically, it relates to a method of preparing a polyhydroxy polymer/borate/salt composition with active materials contained within the matrix.

BSPR:
Polyhydroxy polymers such as polyvinyl alcohol (PVA) are known to react with borates to form water insoluble crosslinked polymers. Japanese Pat. No. 74/48073 describes the use of borax to harden PVA used in the form of micro-capsules to encapsulate perfume and flame retardants. South African Pat. Nos. 69/00122 and 69/00088 disclose the use of PVA-borate capsules for plasticizers and dyes. U.S. Pat. No. 4,110,431 discloses the use of polyvinyl alcohol-borate complexes formed by water activation of mixtures of the PVA and borax in situ for attaching plant treatment additives to plant foliage. U.S. Pat. No. 4,440,746 discloses that PVA can be converted into granular matrices with controlled release properties by reacting PVA/pesticide emulsions or dispersions with borates. Also, U.S. Pat. No. 4,439,488 discloses the reaction of starch or PVA pastes at alkaline pH with boric acid or boric acid derivatives to form an insolubilized gel matrix in which chemical biological agents such as pesticides can be entrapped for controlled release applications.

BSPR:
The active ingredient is emulsified or dispersed in the aqueous polyhydroxy polymer (PHP) system (solution, gel, or paste), the inorganic salt is added thereto, and the resulting mixture is thoroughly blended. The amount of PHP in this reactant mixture prior to addition of borate constitutes from about 3 to about 40% by weight of this reactant mixture, preferably from about 5 to about 30%. The amount of the inorganic salt in the reactant mixture is based on the weight of the reactant mixture prior to addition of borate and constitutes from about 1 to about 30% by weight of this reactant mixture, preferably from about 2 to about 20%. When the borate is added to the blended mixture, crosslinking (or complexing) of the PHP takes place. Either the borate can be added prior to the inorganic salt, the inorganic salt can be added before the borate, or both can be added simultaneously. Generally, it is preferred to add the borate last. In this way the formation of a hard-to-handle (viscous, sticky, voluminous if air gets entrapped) PHP borate gel is avoided or minimized, since the gel, as it is formed, breaks down into a harder, granular material. Depending on the type and concentration of PHP, filler, and inorganic salts used, some of the water will separate, thus resulting in a slurry. The free water can be removed mechanically (e.g., decantation, filtration, centrifugation), thus significantly reducing the drying time and expense. This is especially significant in cases where the active ingredient(s) is volatile or heat sensitive, or where the viscosity or solubility of the PHP requires the use of large amounts of water. The product is then freed from residual absorbed water by drying at ambient and/or elevated temperatures. If necessary, the dried product is ground and classified to the desired particle size. For argricultural applications, a particle size of about 14-60 mesh is used for granular formulations. For dusts, preferred particle range is 10-40 microns. If desired, various additives such as anticaking agents, masking agents, odorants, antidusting agents, colorants, etc., can be added at various stages of the process, in particular before, during, and after the grinding cycle.

BSPR:

A variety of water soluble/swellable polyhydroxy polymers can be used for the present invention. Included are various polyvinyl alcohols, starches (unmodified, modified and substituted types), dextrins, natural gums, cellulose derivatives, etc. Examples of the polyhydroxy polymers are the various partially or fully hydrolyzed polyvinyl acetates sold as polyvinyl alcohols (PVA) in various molecular weight ranges, corn or potato starch, oxidized starch, acid modified starch, hydroxyethyl starch, etc., or combinations thereof.

BSPR:
With respect to optional fillers, a large variety of powdered or granular materials can be employed. Examples are diatomites, attapulgites, bentonites, talcs, montmorillonites, perlites, vermiculites, corn cob grits, wood flour, lignin sulfonates, etc.

BSPR:
As far as the active ingredient(s) is concerned, a large variety of biologically active materials can be employed. In addition to the herbicides and insecticides, the matrices of the present invention will find general utility for the delivery of acaricides, fungicides, nematocides, bactericides, rodenticides, fumigants, animal repellents, insect repellents, plant growth regulators, fertilizers, pheromones, sex lures, flavors, odors, drugs, diet supplements, biological insect control agents, etc. Typical insecticides are, e.g., methyl parathion, parathion, ethoprop, fonofos, fenitrothion, chlorpyrifos, diazinon, phorate, etc., which can be used undiluted, in the form of suited solutions or emulsifiable concentrates, on fillers or salts, or in combinations. Typical herbicides include trifluralin, endothall, 2,4-D, monuron, alachlor, metalachlor, atrazine, and metribuzin.

DEPR:
Nineteen grams of diazinon-loaded diatomite [prepared by dropwise addition of 4.5 grams of technical diazinon to 14.5 grams stirred Celatom MP-78 (Eagle Picher)] were blended with 25 grams of 10% aqueous solution of Vinol 205. Then, 4.8 grams of 25% aqueous Na.sub.2 SO.sub.4 solution were added with mixing, followed by dropwise addition of 2.9 grams of 10% warm borax solution. After sitting for 2 hours with occasional mixing, the mixture was filtered and worked up as usual. The resulting 14-40 mesh granulate analyzed for 16.2% of diazinon.

DEPR:
A mixture of 13.5 grams of corn starch (Starch 3005, marketed by Corn Products), 21.5 grams of water, and 3.1 grams of technical trifluralin was blended in a Waring Blender while 15 ml of 6.6% aqueous NaOH solution were added dropwise. The starch gelatinized and as the mixture became warmer trifluralin melted and became well dispersed. The mixture was allowed to cool to about 35.degree. C., and then 6.0 grams of anhydrous Na.sub.2 SO.sub.4 were added incrementally with stirring. Subsequently, 1.5 grams of finely ground H.sub.3 BO.sub.3 were added incrementally with continued blending whereby the crumb-like product became increasingly harder and finer. The wet mixture was filtered and the filter cake (34.0 grams hard granulate) was dried overnight at ambient temperature. The resulting granulate (21.3 grams) was classified directly to yield 9.4 grams of the desired 14-40 mesh particle range. Grinding the coarse residue once for about 15 seconds in a blender brought the amount of 14-40 mesh granulate to a total of 14.8 grams. The product analyzed for 12.1% of active ingredient.

DEPR:
In an experiment similar to the one mentioned above, the order of adding the anhydrous sodium sulfate and boric acid was reversed; 1.5 grams of boric acid were reacted with the mixture of the corn starch, water, trifluralin and sodium hydroxide; then 8 grams of the anhydrous sodium sulfate were thoroughly mixed into the reaction product. Again, a wet granulate was formed which could be easily filtered. The filter cake (33.8 grams of hard granulate) was dried overnight at ambient temperature. The resulting dry granulate (21.2 grams) was classified directly to yield 11.4 grams of the desired 14-40 mesh particle range.

DEPR:
In an experiment similar to the above but omitting the sodium sulfate [as described by D. Trimnell et al., J. Appl. Pol. Sci. 27, 3919-28, (1982)] and herein incorporated by reference, a rather sticky and rubbery cluster-type of product was obtained which, even upon the recommended addition of 1.8 grams of solid starch powder retained a strong tendency to stick and fuse together to large clusters. The product was dried overnight at ambient temperature and the resulting 20.8 grams of chunks sieved. Essentially, no product passed a 14 mesh

sieve.

DEPR:
A mixture of 13.5 grams of corn starch, 21.0 grams of water, and 3.1 grams of technical trifluralin was blended in a Waring Blender while 15 ml of 6.6% aqueous NaOH solution were added dropwise. A well dispersed mixture formed as a result of gelatinization of the starch and melting of trifluralin. The mixture was allowed to cool to about 30.degree. C. Then, 6.0 grams of MgSO.sub.4 were added incrementally with stirring, followed by incremental addition of 1.5 grams of finely ground H.sub.3 BO.sub.3. Slightly rubbery non-sticky crumbs were formed which were filtered and the resulting filter cake (32.0 grams crumbs) was dried overnight at ambient temperature. The dried granulate (20.9 grams) was ground and classified (2 passes) to yield 15.1 grams product of 14-40 mesh particle size. The product assayed for 13.2% of active ingredient.

DEPR:
Twenty grams of an aqueous gel prepared from 4.0 grams of Clineo 716D (a hydroxyethylated starch marketed by Clinton Corn Processing Co.) and 16 grams water were heated with 0.4 grams of technical trifluralin with stirring until a uniform orange mixture was formed. Then with continued stirring, 5.0 grams of sodium sulfate were added incrementally at ambient temperature, followed by dropwise addition of 2.5 grams of 10% warm aqueous borax solution. The mixture became more compact/granular. After sitting for several hours with occasional blending, the mixture was filtered to yield 10.2 grams of amber crumbs. The product was dried overnight at ambient temperature and the dry crumbs (5.8 grams) were ground in a blender and classified to form 4.4 grams of a granulate of 14-40 mesh range corresponding to 76% of total product.

DEPR:
In another experiment similar to the above sodium sulfate/borax procedure, 4.0 grams of Clinsize 756B (a cyanoethylated starch marketed by Clinton Corn Processing Co.) were substituted for the Clineo 756B to yield 5.8 grams of trifluralin containing product.

CLPR:
10. The method of claim 8 wherein the pest control agent is diazinon.

CLPR:
14. The method of claim 5 or 6 wherein the PHP is a starch.

CLPV:
(a) preparing an aqueous emulsion or dispersion of suitable pest control agent and an optional filler in a matrix-forming material comprising an aqueous solution or gel of a polyhydroxy polymer (PHP) selected from the group of polyvinyl alcohols and starches, wherein said solution or gel has a solids concentration of said PHP of from about 3-40%, and wherein the relative amount of said PHP with respect to said pest control agent is sufficient to entrap said agent within a matrix of said PHP,

ORPL:
Shasha et al., "Starch-borate Complexes for EPTC Encapsulation," Chem. Abs. 100:134169d, (1984).

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L26: Entry 1 of 6 File: USPT Dec 26, 1989

DOCUMENT-IDENTIFIER: US 4889747 A
TITLE: Hydrophobic expanded perlite compositions and process for preparing the same

BSPR:
The utility of expanded perlite as a loose-fill insulation, e.g., block and cavity fillers; aggregates in plaster and wallboard; aggregates in lightweight concrete, e.g., roof decks and prefabricated structural panels; a filtration medium; a soil conditioner; a paint filler; a constituent of oil-well drilling muds and concretes; and inert packing materials is widely known. See Tver and Bolz, Encyclopedic Dictionary of Industrial Technology, Materials, Processes and Equipment, Chapman and Hall, 1984, pages 226-227. However, expanded perlite, which is generally formed by the conversion of contained water in crushed perlite into steam by abrupt heating, absorbs moisture readily and is readily dispersible in an aqueous medium. These properties greatly restrict the commercial applications and the uses of expanded perlite.

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Search Results - Record(s) 1 through 2 of 2 returned.

☑ 1. Document ID: US 4889747 A

L28: Entry 1 of 2 File: USPT Dec 26, 1989

US-PAT-NO: 4889747
DOCUMENT-IDENTIFIER: US 4889747 A

TITLE: Hydrophobic expanded perlite compositions and process for preparing the same

DATE-ISSUED: December 26, 1989

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Wilson; Michael E.	Middleburg	FL		

US-CL-CURRENT: 427/221; 106/2, 106/287.13, 106/DIG.2, 252/378P, 427/387

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

☑ 2. Document ID: US 4018983 A

L28: Entry 2 of 2 File: USPT Apr 19, 1977

US-PAT-NO: 4018983
DOCUMENT-IDENTIFIER: US 4018983 A

TITLE: Electrical arc and fire protective sheath, boot or the like

DATE-ISSUED: April 19, 1977

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Pedlow; J. Watson	Media	PA	19063	

US-CL-CURRENT: 174/135; 106/18.24, 138/177, 174/121A, 174/138F, 174/91, 220/560.01, 220/592.25, 220/88.1, 252/606, 260/DIG.24, 428/921

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

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Terms	Documents
l26 and l27	2

End of Result Set

L28: Entry 2 of 2 File: USPT Apr 19, 1977

DOCUMENT-IDENTIFIER: US 4018983 A
TITLE: Electrical arc and fire protective sheath, boot or the like

BSPR:
The composition preferably further includes intumescing or foaming components which constitute a porous inorganic body which occludes air or moisture and which upon heating tends to expand by release of the occluded air or vaporization of absorbed or bound moisture, whereby the resinous composition intumesces or expands as a foamy body under high temperatures generally above about 350.degree. C. Such components may be micas such as expanded or unexpanded vermiculite, perlite, bentonite or various hydrous oxides typically hydrous alumina, hydrous magnesia, hydrous silica, ferric hydroxide or the like. Such components tend to evolve steam when heated to an activating temperature, even lower than the critical temperature stated. Such steam evolving components begin to evolve the moisture as low as about 220.degree. C, variable with the specific substance, and cause the composition to expand into a foam. The gas evolving component may be cenospheres, tiny glassy balls obtained as fly ash.

BSPR:
Other useful but not essential components in the composition are pigments, fungicides and inert fillers such as calcium carbonate and the like.

BSPR:
The short lengths of heat stable fiber are than added and homogeneously dispersed in the liquid resin. The solid heat stabilizer and fireproofing components are then added in the requisite quantity, including any optional components, pigments, fungicide and sometimes inert filler. The addition of the cenospheres is attended by some foaming since the heat expands and displaces the trapped gas therein, and the mixing is continued until the evolution of gas, such as air bubbles therein ceases. Sometimes, it is useful to apply a vacuum to reduce the foaming time. The plastisol composition after adding the various filler components is a viscous liquid, and will usually be in the range of about 5,000 to 50,000 cps at 25.degree. C.

BSTL:
_____ Component Parts by Weight
_____ a. Thermoplastic resin 100 b. Flame retarding plasticizer 10-150 (preferred range 50-125) c. Heat stabilizer 1-5 (preferably 1.5-3) d. Fire-retardant intumescing 10-150 component (preferaly 50-125) e. Heat resistant short fibers 1-4 (preferably 1.5-3) f. Other components Q.S. (pigments, fungicides etc.) Optional _____

DEPR:
Optionally, a fungicide which is compatible with the plasticizer system may also be included in the composition. Suitable fungicides include metallo-organic complexes wherein the metal is mercury or arsenic. As a preferred fungicide may be mentioned the condensation product of 10,10'-oxybisphenoxarsene and epoxidized soybean oil. The fungicide, if employed, should be present in minor, effective amounts, say about 0.2 to 8 parts per 100 parts by weight of polyvinyl chloride resin.

DEPR:
The physical admixing of the components of the plastisol composition may follow well-known methods. The plasticizers, if more than one be employed, may first be blended together, a portion of the blend set aside for later addition, and the polyvinyl chloride resin incrementally added to the blend with agitation until

uniform dispersion is obtained. Next, there may be added slowly with continuous mixing the heat stabilizer, alumina hydrate, and any fungicide, supplementary fire-retardant, filler, pigment, etc., to be included, after which the remaining plasticizer is incorporated, again mixing until uniform. The cenospheres may then be blended into the composition and, if desired, the final composition may be subjected to vacuum deaeration.

DEPR:
Polyvinyl chloride plastisol in quantity of 72 parts mixed with 28 parts of polyvinyl extender resin, a coarser polyvinyl chloride of particle size in the range of about 50-100 mesh, is blended in a dough mixer with 92 parts of cresyl diphenyl phosphate, 23 parts of chlorinated paraffin wax (chlorowax 500) and an extender of 24 parts of heavy aromatic oil, such as a mixture of lower alkyl benzenes (Eseoflex 150) and a heat stabilizer, a mixture of barium, cadmium and zinc thiolate with small quantities of lead naphthenate in quantity of 2 parts, all parts being by weight. Into the mix is added 3 parts of antimony oxide, 60 parts of hydrous alumina having 38% of water of hydration and 40 parts cenospheres (fly ash). There is further added 2 parts of heat stable fibers which are fire-resistant aramide having mixed lengths between 1/4 inch and 3/8 of an inch sold by DuPont as fiber floc under the trade name Nomex. Finally, 7 parts of titanium dioxide pigment, 1 part of calcium oxide and 1 part of fungicide 10'10' oxybis phenoxarsene (vinyzene BP.5). The components are mixed in a dough mixer at room temperature, first supplying all but about 1/4 of the plasticizer and extender liquids, and then in three small increments the polyvinyl chloride, first blending one to complete liquidity before the next is added, and thereafter the solids are stirred into the mixture with slow continuous mixing. A small amount of a final quantity of plasticizer is added as a final thinner with the last added cenospheres. The final fluid mix has a viscosity of about 10,000-45,000 c.p.s. at 25.degree.-27.degree. C measured with a number six spindle at about 10 r.p.m. A stainless steel mandrel as shown in FIG. 1 which has a lower portion of a diameter of about 11/2 to 3 inches and an upper flared portion with a diameter of about 3 to 6 inches respectively, faired smoothly from one diameter to the other, is preheated to 150.degree. to 210.degree. C and dip coated on its outer surface as it is slowly rotated with the composition as formed above. A coating having a thickness of about 0.125 inch remains, and it is set by the heat transferred by the hot mandrel into a gelated film. Further heat may be applied to complete fusion by placing the coated part into an oven at 175.degree. to 200.degree. C or immersing in molten salt at 200.degree. C. On cooling the film is slit longitudinally by a knife blade and peeled from the mandrel. The boot was mounted about an inner lead sleeve in close surface contact thereon, and the assembly was exposed by mounting it above the tip of a flame of a Fisher burner having a tip temperature of 1700.degree. F (plus or minus 50.degree. F). The heat did not melt or sag to expose the lead and therefore the lead did not melt during a 20 minute exposure to this temperature. Moreover, a thermo couple inserted within the lead sheath to measure the temperature during the test ranged from 75.degree.-195.degree. F well below the melting point of the lead, indicating the great merit of this protective boot.

DEPR:
Certain modifications will occur to those skilled in the art. Many other commonly used components of the fireproofing composition may be included here. Other stabilizer substances of the character of heat stabilizers, fungicides, pigments or the like may be varied. The term molded or cast product is used herein in a generic sense to include extrusion, spray and knife or doctor coating in laminate or layer form, and other forming processes to convert the solid plastic form hereof to a useful shape for the purpose intended.

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Search Results - Record(s) 1 through 5 of 5 returned.

☐ 1. Document ID: US 20020002171 A1

L36: Entry 1 of 5 File: PGPB Jan 3, 2002

PGPUB-DOCUMENT-NUMBER: 20020002171
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020002171 A1

TITLE: Materials and methods for killing nematodes and nematode eggs

PUBLICATION-DATE: January 3, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Chalquest, Richard R.	La Jolla	CA	US	

US-CL-CURRENT: 514/254.03; 514/326, 514/363

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

☐ 2. Document ID: US 20010049373 A1

L36: Entry 2 of 5 File: PGPB Dec 6, 2001

PGPUB-DOCUMENT-NUMBER: 20010049373
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20010049373 A1

TITLE: Materials and methods for killing nematodes and nematode eggs

PUBLICATION-DATE: December 6, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Chalquest, Richard R.	La Jolla	CA	US	

US-CL-CURRENT: 514/269; 514/252.14, 514/364

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

☑ 3. Document ID: US 5830827 A

L36: Entry 3 of 5 File: USPT Nov 3, 1998

US-PAT-NO: 5830827
DOCUMENT-IDENTIFIER: US 5830827 A

TITLE: Granular herbicidal composition comprising flazasulfuron and a sulfosuccinate or benzoate stabilizer

DATE-ISSUED: November 3, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Maeda; Masaru	Shiga			JPX

US-CL-CURRENT: 504/215; 504/367

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

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☑ 4. Document ID: US 5739081 A

L36: Entry 4 of 5 File: USPT Apr 14, 1998

US-PAT-NO: 5739081
DOCUMENT-IDENTIFIER: US 5739081 A

TITLE: Water dispersible granules of liquid pesticides

DATE-ISSUED: April 14, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Lloyd; John M.	Richmond			NZX
Baker; Kevin R.	Richmond			NZX

US-CL-CURRENT: 504/361; 424/405, 504/367, 71/64.03

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

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☑ 5. Document ID: US 5338533 A

L36: Entry 5 of 5 File: USPT Aug 16, 1994

US-PAT-NO: 5338533
DOCUMENT-IDENTIFIER: US 5338533 A

TITLE: Controlled release device, and method of preparation

DATE-ISSUED: August 16, 1994

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Derrieu; Guy	Cagnes sur Mer			FRX

US-CL-CURRENT: 424/411; 424/405, 424/406, 424/409

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

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L36: Entry 3 of 5 File: USPT Nov 3, 1998

DOCUMENT-IDENTIFIER: US 5830827 A
TITLE: Granular herbicidal composition comprising flazasulfuron and a sulfosuccinate or benzoate stabilizer

ABPL:
A granular herbicidal composition which comprises 1-(4,6-dimethoxypyrimidin-2-yl)-3-(3-trifluoromethyl-2-pyridylsulfonyl)ure a or a salt thereof as a herbicidal active ingredient, together with a chemical stabilizer and a carrier.

BSPR:
The present invention relates to a granular herbicidal composition which comprises 1-(4,6-dimethoxypyrimidin-2-yl)-3-(3-trifluoromethyl-2-pyridylsulfonyl)ure a (common name: flazasulfuron, hereinafter referred to simply as "Compound A") or a salt thereof as a herbicidal active ingredient, together with a chemical stabilizer and a carrier.

BSPR:
JP-A-5-271021 discloses an improved herbicidal composition to which an inorganic magnesium salt is added, the composition comprising Compound A or a salt thereof and at least one compound selected from the group consisting of glufosinate, bialaphos, glyhosate and salts thereof as an active ingredient (the term "JP-A" as used herein means an "unexamined published Japanese patent application"). When the improved herbicidal composition is diluted with water and sprayed, the active ingredient in the spray solution is stabilized, the acidity of the spray solution is improved, and the hygroscopicity of preparations is inhibited by adding the inorganic magnesium salt. That is, JP-A-5-271021 does not disclose or suggest the granular herbicidal composition of the present invention wherein the storage stability of Compound A is enhanced by using a specific chemical stabilizer.

BSPR:
On the other hand, most of herbicides for use in crop lands (e.g., uplands, orchards, mulberry plantations) and non-crop lands (e.g., forests, factory sites, turf fields) are formulations which are diluted with water prior to spraying, such as wettable powders, emulsifiable concentrates, and liquid formulations. During the entire process of weeding with the use of such a herbicide, a considerably long time and much labor are needed for securing and transporting water, preparing a spray solution, and the like. Thus, the longer time and the more labor are required with an increase in the application area in the case of spraying in flat lands as well as in mountains. In order to minimize the labor, the dilution of the herbicide with water itself should be reconsidered.

BSPR:
Accordingly, there have been developed various granular herbicidal compositions such as micro granules without diluting with water. Although formulation of a granular herbicidal composition comprising Compound A as a herbicidal active ingredient is attempted to thereby give an improved granular herbicidal composition, there remained a problem in the storage stability of Compound A in the composition.

BSPR:
Under these circumstances, the present inventors have conducted extensive studies in order to find an excellent granular herbicidal composition while taking the storage stabilization of Compound A into consideration. As a result, the present invention have been accomplished.

BSPR:

That is, the present invention relates to a granular herbicidal composition which comprises Compound A or a salt thereof as a herbicidal active ingredient, together with a chemical stabilizer and a carrier.

BSPR:
Examples of the salt of Compound A used as the herbicidal active ingredient in the granular herbicidal composition of the present invention include a salt of alkali metal (e.g., sodium, potassium), a salt of alkaline earth metal (e.g., magnesium, calcium), a salt of amine (e.g., monomethylamine, monoisopropylamine, dimethylamine, diisopropylamine, triethylamine), and a salt of quaternary ammonium cation (e.g., trimethylethylammonium cation, tetramethylammonium cation).

BSPR:
If necessary, the granular herbicidal composition of the present invention may further comprise various formulants or herbicidal active ingredients other than Compound A. Next, they will be described below.

BSPR:
The formulants are used for contributing to the improvement in the physical properties of the granular herbicidal composition.

BSPR:
oil-absorbents, such as white carbon, hydrolyzed starch, clay, talc, diatomaceous earth, an artificially synthesized product of diatomaceous earth and lime, asbestos, a mixture of kaolinite and sericite, calcium silicate, calcium carbonate, calcium carbonate silicate, acid clay, carbon black, graphite, pearlite, alumina, titanium dioxide, basic magnesium carbonate, magnesium silicate aluminate, silica.alumina filler, and magnesium silicate hydrate;

BSPR:
The herbicidal active ingredients other than Compound A include the following ones (expressed in common names). They may be used alone or as a mixture of two or more.

BSPR:
(1) Those which are believed to exhibit herbicidal effects as a result of their ability to mimic the activity of endogenous auxin, including

BSPR:
(2) Those which are believed to exhibit herbicidal effects by inhibiting photosystem of plants, including

BSPR:
(3) Quaternary ammonium salt compounds such as paraquat and diquat, which are believed to exhibit herbicidal effects by oxygen activation and oxygen reduction.

BSPR:
(4) Those which are believed to exhibit herbicidal effects by inhibiting chlorophyll biosynthesis of plants and abnormally accumulating a photooxidizer of membrane lipids in the plant body, including

BSPR:
(5) Those which are believed to exhibit herbicidal effects characterized by the bleaching effect by inhibiting pigment (e.g., carotenoids) biosynthesis of plants, including

BSPR:
(6) Those which exhibit herbicidal effects specifically to grass weeds, including

BSPR:
(7) Those which are believed to exhibit herbicidal effects by inhibiting an amino acid biosynthesis of plants, including

BSPR:
(8) Those which are believed to exhibit herbicidal effects by inhibiting cell division of plants, including

BSPR:

(9) Those which are believed to exhibit herbicidal effects by inhibiting protein biosynthesis or lipid biosynthesis of plants, including

BSPR:
The blending ratio of the components contained in the granular herbicidal composition of the present invention cannot be generally specified because it depends on the kind of the blending components, the blending method, and the like. However, based on 100 parts by weight of the granular herbicidal composition as a whole, the amount of Compound A or a salt thereof is usually from 0.02 to 1.0 parts by weight, preferably from 0.03 to 0.6 parts by weight; the amount of the chemical stabilizer is usually from 0.1 to 10.0 parts by weight, preferably from 0.5 to 7.0 parts by weight; and the amount of the carrier constituting the main of the balance is usually from 50.0 to 99.88 parts by weight, preferably from 60.0 to 99.47 parts by weight. When the granular herbicidal composition further comprises various formulants and other herbicidal active ingredients, the total amount of the formulants is usually from 0.1 to 80.0 parts by weight, preferably from 0.2 to 35.0 parts by weight, and the amount of other herbicidal active ingredients is usually from 0.01 to 30.0 parts by weight, preferably from 0.02 to 15.0 parts by weight. The blending ratio of various formulants which may be optionally used will be described in greater detail. The amount of surfactants is usually from 0.1 to 10.0 parts by weight, preferably from 0.2 to 5.0 parts by weight; the amount of binders is usually from 0.1 to 10.0 parts by weight, preferably from 0.2 to 5.0 parts by weight; the amount of oil-absorbents is usually from 0.1 to 50.0 parts by weight, preferably from 0.2 to 20.0 parts by weight; the amount of solvents is usually from 0.1 to 10.0 parts by weight, preferably from 0.2 to 5.0 parts by weight; the amount of organic acids is usually from 0.1 to 10.0 parts by weight, preferably from 0.1 to 5.0 parts by weight.

BSPR:
The granular herbicidal composition of the present invention can be prepared by a publicly known method, for example, extruding granulation, spray drying granulation, fluidized bed granulation, tumbling granulation or agitation granulation. In the extruding granulation which is one of the preferable embodiments of the present invention, for example, Compound A or a salt thereof, the chemical stabilizer and the carrier are blended together optionally with various formulants and other herbicidal active ingredients (In this step, all of the components may be mixed together at once or arbitrary ones may be first mixed followed by the addition of the remaining ones). Next, the obtained mixture is kneaded with water, preferably after dry grinding. When liquid components are used, they may be added together with water in the kneading step. After the completion of the kneading, the material is granulated by using an extruder, dried by fluidized bed drying, compartment tray drying, and the like, and then sieved to thereby give the granular herbicidal composition.

BSPR:
The granular herbicidal composition of the present invention thus prepared usually has a particle size of 16 to 100 mesh (corresponding to 1,000 to 150 .mu.m), preferably 22 to 83 mesh (corresponding to 710 to 180 .mu.m). The particle number of the granular herbicidal composition of the present invention is usually from 2,000 to 30,000, preferably from 3,500 to 10,000, per gram of the granular herbicidal composition. The granular herbicidal composition of the present invention having the particle size and the particle number as defined above suffers from no drift at application and can establish excellent herbicidal effects all over the application area.

BSPR:
The granular herbicidal composition of the present invention is applied directly onto crop lands (for example, uplands, orchards, mulberry plantations) and non-crop lands (for example, forests, factory sites, turf fields) without diluting with water. Thus, it is advantageous in that excellent herbicidal effects can be established all over the application area in a small application dose, compared with the conventional micro granules, without causing any problem of drifting.

BSPR:
Next, preferable embodiments of the granular herbicidal composition of the present invention will be given.

BSPR:
(1) A granular herbicidal composition comprising Compound A or a salt thereof as

a herbicidal active ingredient, together with a chemical stabilizer and a carrier.

BSPR:
(2) A granular herbicidal composition comprising Compound A as a herbicidal active ingredient, together with a chemical stabilizer and a carrier.

BSPR:
(3) A granular herbicidal composition as described in the above (1) or (2) which further comprises a binder as a formulant.

BSPR:
(4) A granular herbicidal composition as described in the above (1), (2) or (3) which further comprises other herbicidal active ingredient(s).

BSPR:
(5) A granular herbicidal composition as described in the above (1) or (2) which comprises from 0.02 to 1.0 part by weight of Compound A or a salt thereof, and from 0.1 to 10.0 parts by weight of a chemical stabilizer, each based on 100 parts by weight of the granular herbicidal composition, and the balance mainly comprising a carrier.

BSPR:
(6) A granular herbicidal composition as described in the above (3) which comprises from 0.02 to 1.0 part by weight of Compound A or a salt thereof, from 0.1 to 10.0 parts by weight of a chemical stabilizer, and from 0.1 to 10.0 parts by weight of a binder, each based on 100 parts by weight of the granular herbicidal composition, and the balance mainly comprising a carrier.

BSPR:
(7) A granular herbicidal composition as described in the above (4) which comprises from 0.02 to 1.0 part by weight of Compound A or a salt thereof, from 0.1 to 10.0 parts by weight of a chemical stabilizer, from 0.1 to 10.0 parts by weight of a binder, and from 0.01 to 30.0 parts by weight of other herbicidal active ingredient(s), each based on 100 parts by weight of the granular herbicidal composition, and the balance mainly comprising a carrier.

BSPR:
(8) A granular herbicidal composition as described in the above (1), (2), (3), (4), (5), (6) or (7), wherein the chemical stabilizer is at least one compound selected from the group consisting of dialkylsulfosuccinates and benzoates.

BSPR:
(9) A granular herbicidal composition as described in the above (1), (2), (3), (4), (5), (6) or (7), wherein the chemical stabilizer is Newkalgen EX-70 (trade name) produced by Takemoto Oils and Fats Co., Ltd. (a mixture of sodium dioctylsulfosuccinate with sodium benzoate).

BSPR:
(10) A granular herbicidal composition as described in the above (1) , (2) , (3), (4) , (5), (6), (7), (8) or (9), wherein the carrier is at least one material selected from the group consisting of talc, bentonite and clay.

BSPR:
(11) A granular herbicidal composition as described in the above (3), (4), (6), (7), (8), (9) or (10), wherein the binder is at least one material selected from the group consisting of a sodium salt of carboxymethyl cellulose, a sodium lignin sulfonate, a calcium lignin sulfonate and hydroxypropyl cellulose.

BSPR:
(12) A granular herbicidal composition as described in the above (1), (2), (3), (4), (5), (6), (7), (8), (9), (10) or (11) which has a particle size of 16 to 100 mesh (corresponding to 1,000 to 150 .mu.m).

BSPR:
(13) A granular herbicidal composition as described in the above (1), (2), (3), (4), (5), (6), (7), (8), (9), (10), (11) or (12) which has 2,000 to 30,000 particles per gram of the granular herbicidal composition.

BSPV:
phenoxy compounds, such as 2,4-D, MCPA, MCPB, and naproanilide;

DEPR:
The above components were uniformly mixed and dry-ground with a centrifugal pulverizer (screen: 1 mm diameter). The ground matter thus obtained was kneaded with water and granulated with an extruder (Model G-72-100 W; produced by Shin-ei Kikai Seisakusho; screen: 0.6 mm diameter), subjected to fluidized bed drying (at 60.degree. C. for 30 minutes) and then sieved [particle size: 22-83 mesh (corresponding to 710-180 .mu.m)] to thereby give a granular herbicidal composition. This product had 5,100 particles per grain.

DEPR:
In accordance with the process described in Formulation Example 1, granular herbicidal compositions were prepared with the use of the components listed in Table 1 described below at the given ratios (parts by weight).

DEPR:
The above components (1) to (4) were uniformly mixed and dry-ground with the use of a centrifugal pulverizer (screen: 1 mm diameter). The ground matter thus obtained was kneaded with water containing the component (5) and granulated with the same extruder as in Formulation Example 1 (screen: 0.6 mm diameter), subjected to fluidized bed drying (at 60.degree. C. for 30 minutes) and then sieved [particle size: 22-83 mesh (corresponding to 710-180 .mu.m)] to thereby give a granular herbicidal composition. This product had 5,200 particles per gram.

DEPR:
The procedure of Formulation Example 7 was repeated but varying the amount of talc from 71.4 parts to 72.65 parts and replacing 2.0 parts of SANEKISU C by 0.75 parts of hydroxypropyl cellulose to thereby give a granular herbicidal composition. This product had 5,100 particles per gram.

DEPR:
These components were uniformly mixed and processed in the same manner as in Formulation Example 1 to thereby give a granular herbicidal composition. This product had 6,400 particles per gram.

DEPR:
The procedure of Formulation Example 9 was repeated but varying the amount of Compound A from 0.05 parts to 0.15 parts and the amount of talc from 82.95 parts to 82.85 parts to thereby give a granular herbicidal composition. This product had 4,800 particles per gram.

DEPR:
The procedure of Formulation Example 9 was repeated but varying the amount of Compound A from 0.05 parts to 0.1 parts, the amount of bentonite from 15.0 parts to 25.0 parts and the amount of talc from 82.95 parts to 72.9 parts to thereby give a granular herbicidal composition. This product had 5,400 particles per gram.

DEPR:
In accordance with the process described in Formulation Example 1 or 7, granular herbicidal compositions are prepared with the use of the components listed in Table 2 described below at the given ratios (parts by weight).

DEPR:
These components were uniformly mixed and processed in the same manner as in Formulation Example 1 to thereby give a granular herbicidal composition. This product has 4,000 to 6,000 particles per gram.

DEPR:
These components are uniformly mixed and processed in the same manner as in Formulation Example 1 to thereby give a granular herbicidal composition. This product has 4,000 to 6,000 particles per gram.

DEPR:
The procedure of Formulation Example 18 is repeated but varying the amount of GEROPON SDS from 1.5 parts to 5.0 parts and the amount of talc from 73.4 parts to 69.9 parts to thereby give a granular herbicidal composition. This product has 4,000 to 6,000 particles per gram.

DEPR:

These components were uniformly mixed and processed in the same manner as in Formulation Example 1 to thereby give a granular herbicidal composition. This product had 5,400 particles per gram.

DEPR:
These components were uniformly mixed and processed in the same manner as in Formulation Example 1 to thereby give a granular herbicidal composition. This product had 5,200 particles per gram.

DEPR:
Fifty grams of the granular herbicidal compositions obtained in Formulation Examples 1 to 11 and Comparative Formulation Examples 1 and 2 were each introduced into a glass container provided with a stopper and subjected to an accelerated storage stability test at a constant temperature of 50.degree. C. for 1 month. After predetermined period, the decomposition rate of Compound A was determined by HPLC. Table 3 shows the results.

DEPR:
The results in Table 3 show that the granular herbicidal compositions of the present invention (formulation Examples 1 to 11) containing chemical stabilizers are obviously superior in the storage stability to those free from any chemical stabilizer (Comparative Formulation Examples 1 and 2).

DEPR:
One hundred grams of the granular herbicidal composition obtained in Formulation Example 17 was introduced into a glass container provided with a stopper and subjected to an accelerated storage stability test at a constant temperature of 40.degree. C. for 3 months. After 3 months, the decomposition rate of Compound A determined by HPLC was 1.6%, which indicated that this product had a remarkably high storage stability similar to the results of Test Example 1.

CLPR:
1. A granular herbicidal composition which comprises 1-(4,6-dimethoxypyrimidin-2-yl)-3-(3-trifluoromethyl-2-pyridylsulfonyl)ure a or a salt thereof as a herbicidal active ingredient, together with a chemical stabilizer and a carriers wherein the granular composition has a particle size of from 16 to 100 mesh corresponding to from 1,000 to 150 .mu.m.

CLPR:
2. The granular herbicidal composition as claimed in claim 1, wherein said chemical stabilizer is at least one compound selected from the group consisting of dialkylsulfosuccinates and benzoates.

CLPR:
3. A granular herbicidal composition which comprises from 0.02 to 1.0 part by weight of 1-(4,6-dimethoxypyrimidin-2-yl)-3-(3-trifluoromethyl-2-pyridylsulfonyl)ure a or a salt thereof as a herbicidal active ingredient, and from 0.1 to 10.0 parts by weight of a chemical stabilizer, each based on 100 parts by weight of said granular herbicidal composition, and the balance comprising a carrier wherein the granular composition has a particle size of from 16 to 100 mesh corresponding to from 1,000 to 150 .mu.m.

CLPR:
4. The granular herbicidal composition as claimed in claim 3, wherein said chemical stabilizer is at least one compound selected from the group consisting of dialkylsulfosuccinates and benzoates.

CLPR:
5. The granular herbicidal composition as claimed in claim 3, which further comprises from 0.1 to 80.0 parts by weight of a formulant.

CLPR:
6. The granular herbicidal composition as claimed in claim 3, which further comprises from 0.01 to 30.0 parts by weight of other herbicidal active ingredient.

CLPR:
7. The granular herbicidal composition as claimed in claim 3, which further comprises from 0.1 to 80.0 parts by weight of a formulant and from 0.01 to 30.0 parts by weight of other herbicidal active ingredient.

ORPL:
CA 125:79418, Nakayama et al, "Stabilized solid agrochemical preparations containing sulfonylureas", JP08104603 (Apr. 23, 1996).

ORPL:
Chemical Abstracts, vol. 120, No. 11, Abstract 120:127796 of JP5-271021 1994, "Herbicide Compositions Containing Magnesium Salts".

L36: Entry 4 of 5 File: USPT Apr 14, 1998

DOCUMENT-IDENTIFIER: US 5739081 A
TITLE: Water dispersible granules of liquid pesticides

ABPL:
Water dispersible granules suitable for agricultural application are prepared by first preparing absorbent water dispersible granules and then loading biologically active substances into the preformed absorbent granules.

BSPR:
This invention relates to water dispersible granules for agricultural use. More particularly, the invention relates to water dispersible granules that carry biologically active substances, in liquid form, including pesticides and/or adjuvants which enable the active substances to be delivered to target species.

DEPR:
In this specification, the term biologically active substance is used in its broadest sense to include not only the control of unwanted plants and animals but also substances which are applied to an animal or plant to achieve a beneficial effect. The substance can be, for example, a plant growth regulator or an animal growth regulator. In the case of plants, the pests will be weeds or other undesirable vegetation in a particular locus. In the case of animals, arthropods, nematodes and the like and larger animals such as rabbits, rats and mice and the like. Lower organisms are also included within the scope of the invention, particularly where they are harmful in a particular locus, such as fungi, algae and other micro-organisms. The term pesticides will include substances which control such pests, e.g. substances which destroy the pest but also substances which stop the pest from multiplying or reproducing. The term can thus cover herbicides, insecticides, molluscicides, nematicides, fungicides and the like.

DEPR:
Suitable substances for use as the finely divided filler include mineral earths and clays such as bentonite, kaolin, attapulgite, diatomaceous earth, zeolites, calcium carbonate, talc, muscovite mica and manufactured materials such as precipitated silicas and silicates, fused sodium potassium, aluminium silicate (heat processed perlite) or organic materials such as coals, lignites and plastics. The fillers are preferably water insoluble. The finely divided filler itself may be absorbent as in the case of diatomaceous earth, attapulgite or zeolites but this is not essential as it is the overall absorbency of the granule rather that of the individual particles that is important to the working of the invention. However, we have found that the overall absorbency of granules usually increases when absorbent particles are used.

DEPR:
The absorbency of the granules is believed, without limiting the scope of the invention, to result in part from inclusions of voids between the finely divided particles. Accordingly the degree of packing will influence the degree of absorbency of the granules. The absorbency can also be varied by choosing different fillers that effect the packing. The degree of absorbency can be fine tuned further by using a mixture of different fillers. For example heat processed expanded perlite fillers tend to lead to highly absorbent granules while mica or talc fillers lead to less absorbent granules. The degree of absorbency of a granule can thus be varied by varying the ratio of heat processed perlite to mica.

DEPR:
This Example illustrates the preparation of water dispersible granules of two samples, 9A and 9B comprising 30% w/w Diazinon. It was prepared in the laboratory as follows:

DEPR:
This example shows the preparation of 12.5% w/w active content Fluazifop-P-butyl herbicide with a mineral oil also present in the granule

DEPR:
This example shows the preparation of a 25% w/w active content Fluzifop-P-butyl herbicide where the active substance formula has alternative surfactants to that used in Example 11. The granules were prepared as for Example 11, using the same weight amounts and process except that the active substance formula was as follows:

DEPL:
The process of Example 1 was repeated to provide granules with 25% w/w Fluazifop-P-butyl herbicide.

DEPL:
The process of Example 1 was used to provide granules with 30% Fluzifop-P-butyl herbicide.

DEPL:
The process of Example 1 was repeated to provide granules with 30% Fluzifop-P-butyl herbicide.

DEPL:
The process of Example 1 was repeated to provide granules with 30% Fluzifop-P-butyl herbicide.

DEPL:
A 500 gram sample of the above was prepared by adding 324.55 gram of granules to 175.45 grams of diazinon formulation in a polythene bag. The end of the bag was sealed by twisting and the contents were thoroughly mixed by hand.

DEPC:
Preparation of 30% w/w active content Fluazifop-P-butyl herbicide.

DEPC:
Preparation of 25% w/w active content Fluazifop-P-butyl herbicide.

DEPC:
Preparation of 30% active content Fluazifop-P-butyl herbicide.

DEPC:
Preparation of 30% active content Fluazifop-P-butyl herbicide with different surfactant in the absorbent granule.

DEPC:
Preparation of 30% active content Fluzifop-P-butyl herbicide using fillers that differ from Example 5.

DEPC:
Preparation of 30% active content Fluzifop-P-butyl herbicide using the process of Example 1 but varying the filler composition of the absorbent granule.

DEPC:
Preparation and biological testing of 25% active content Fluazifop-P-butyl herbicide.

DETL:
_____ Solubility Chemical Type in water
_____ Acetochlor Herbicide 223 mg/l Butachlor Herbicide 23 mg/l Butylate Herbicide 46 mg/l Chlorfenvinphos Insecticide 145 mg/l Chlorimephos Insecticide 60 mg/l Diazinon Insecticide 40 mg/l Dinocap Acaricide Fung. (Sp. soluble) Fenitrophion Insecticide 14 mg/l Fluazifop-P-butyl Herbicide 1 mg/l Fonofos Insecticide 13 mg/l Heptopargil Plant growth 1 g/l Regulator Isofenphos Insecticide 23.8 mg/l Lambda-cyhalothrin Insecticide 0.005 mg/l Mecarbam Acaricide Insect. <1 gm/l Metolachlor Germination Inhib. 530 mg/l Omethoate Acaricide Insect. 0.5 g/l Pebulate Herbicide 60 mg/l Pirimiphos-methyl Acaricide Insect 5 mg/l Propetamphos Insecticide 110 mg/l Propargite Acaracide 1.9 mg/l Prosulfocarb Herbicide 13.2 mg/l Pyraclofos Insecticide 33 mg/l Sulprofos Insecticide <5 mg/l Thiobencarb Herbicide 30 mg/l Triazophos Acaricide

Insect. 30-40 mg/l Bromophos-ethyl Insecticide 0.14 mg/l Butamifos Herbicide 5.1 mg/l Carbophenothion Acaricide Insect. <1 mg/l Cyhalothrin Insecticide 0.003 mg/l Demeton-S-methyl Insecticide 3.3 g/l Dichloruos Insecticide 10 g/l Disulfoton Acaricide Insect. 25 mg/l Fenpropimorph Fungicide 10 mg/l Heptenophos Insecticide 2.2 g/l Hydroprene Insect growth reg. 0.54 mg/l Malathion Acaracide Insect. 145 mg/l Mephosfolan Insecticide 57 mg/l Molinate Herbicide 880 mg/l Parathion Acaricide Insec. 24 mg/l Permethrin Insecticide 0.2 mg/l Profenofos Insecticide 20 mg/l Propiconazole Fungicide 110 mg/l Prothiofos Insecticide 1.7 mg/l Pyrifenox Fungicide 115 mg/l Tebutam Herbicide Almost Insoluble in water Thiometon Insecticide 200 mg/l Tridemorph Fungicide 11.7 mg/l

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DETL:

(a) Absorbent Granule Formula Ingredient % w/w Perlite SP412 (Diaclite 412 45 ex Induplex Inc. Philippines) Mica 20 (20 micron) (Mintech (NZ) Ltd) 45 Reax 80N (Westvaco Pacific Pty Ltd 10 North Sydney Sodium Lignin sulphonate)

(b) Active Substance Formula Ingredient % w/w Fluazifop-P-butyl 88.0 Tech. grade (90.9% a.i.) Teric 200 (ICI Australia, poly 9.6 propylene ethylene oxide surfactant Kemmat SC15 (Calcium dodecyl 2.4 benzene sulphonate emulsifier) Harcros Industrial Chemicals, NSW

(c) Finished Product Composition Component % w/w Absorbent granules 56.24 Active substance formulation 43.76

(d) Finished Product Formula Ingredient % w/w Fluazifop-P-butyl, tech grade 38.509 Perlite SP412 25.308 Mica 20 25.308 Reax 80N 5.625 Teric 200 4.200 Kemmat SC15B 1.050

DETL:

(a) Absorbent Granule Formula Ingredient % w/w Mica 20 60 Perlite SP412 30 Reax 80N 10

(b) Active Substance Formula Ingredient % w/w Fluazifop-P-butyl 88 Tech. grade (90.9% a.i.) Teric 200 9.6 Kemmat SC15 2.4

(c) Finished Product Composition Component % w/w Absorbent granule 68.74 Active substance formulation 31.26

(d) Finished Product Formula Ingredient % w/w Fluazifop-P-butyl, tech grade 27.510 Mica 20 41.244 Perlite SP412 20.622 Reax 80N 6.874 Kemmat SC15B 0.750 Teric 200 3.000

DETL:

(a) Absorbent Granule Formula Ingredient % w/w Mica 20 50 Perlite SP412 40 Reax 80N 10

(b) Active Substance Formula Ingredient % w/w Propargite, technical 90.0 grade (85.1% a.i) Teric 200 7.0 Kemmat SC15 3.0

(c) Finished Product Composition Component % w/w Absorbent granules 60.83 Active substance formulation 39.17

(d) Finished Product Formula Ingredient % w/w Propargite, tech. grade 35.253 Mica 20 30.415 Perlite SP412 24.332 Reax 80N 6.083 Teric 200 2.742 Kemmat SC15 1.175

DETL:

(a) Absorbent Granule Formula Ingredient % w/w Perlite SP412 50 Mica 20 40 Tamol PP (ex BASF) (Sodium salt 10 of phenolsulphonic acid condensation product).

(b) Active Substance Formula Ingredient % w/w Fluazifop-P-butyl 88 Tech. grade (90.9% a.i.) Teric 200 9.6 Kemmat SC15 2.4

(c) Finished Product Composition Component % w/w Absorbent granules 62.49 Active substance formulation 37.51

DETL:

(a) Absorbent Granule Formula Ingredient % w/w Perlite SP412 50 Mica 20 38 Lomar PWM 12 (Sodium salt of condensed Naphthalene sulfonic acid (Henkel Corporation, USA).

(b) Active Substance Formula Ingredient %

w/w Fluazifop-P-butyl 88 Tech. grade (90.9% a.i.) Teric 200 9.6 Kemmat SC15 2.4 (c) Finished Product Composition Component % w/w Absorbent granules 62.49 Active substance formulation 37.51

DETL:

(a) Absorbent Granule Formula Ingredient % w/w Perlite SP412 50 Talc Superfine 15 40 Morwet D425 10 (b) Active Substance Formula Ingredient % w/w Fluazifop-P-butyl 88 Tech. grade (90.9% a.i.) Teric 200 9.6 Kemmat SC15B 2.4 (c) Finished Product Composition Component % w/w Absorbent granules 62.49 Active substance formulation 37.51

DETL:

% w/w Diazinon Formulation Ingredient Diazinon Technical Grade @ 95% AI 90 Teric 200 5 Kemmat HF 60 5 Granule Composition 9A Perlite SP 412 55 Talc Superfine 15 35 Supragil MNS 90 10 Granule Composition 9B Perlite SP 412 55 Talc Superfine 15 35 Ultrazine NA 10 Loading Recipe for 9A & 9B Ingredient Absorbent Granules 64.91 Diazinon formulation 35.09

DETL:

Final Formulation Details Ingredient % w/w Diazinon 300 9A Perlite SP 412 35.71 Talc Superfine 15 22.72 Supragil MNS 90 6.49 Diazinon Technical Grade @ 95% AI 31.58 Teric 200 1.75 Kemmat HF 60 1.75 Diazinon 300 9B Perlite SP 412 35.71 Talc Superfine 15 22.72 Ultrazine NA 6.49 Diazinon Technical Grade @ 95% 31.58 Teric 200 1.75 Kemmat HF60 1.75 Laboratory Test Results Initial Sieve Tests % Retained 150 mm % Retained 53 mm Diazinon 300 9A 0.008 0.012 Diazinon 700 9B 0.012 0.033 Dispersion Diazinon 300 9A 80 seconds Diazinon 300 9A 105 seconds Suspensibility Diazinon 300 9A 75.3% Diazinon 300 9B 90.1%

DETL:

Ingredient % w/w Active Substance Formula Fluazifop-P-butyl (Tech. grade) 88 Teric 200 9.6 Kemmat HF 60 2.4 Absorbent Granule Recipe Perlite SP 412 55 Talc superfine 15 35 Ultrazine NA 10

DETL:

TABLE 1 Fluazifop-P-butyl herbicides WG, comparison of formulations on barnyard grass in soybeans at 187.5 GAI/HA Location: Coree South, Southern N. S. W Treatment % Control Seed Heads/M2 27 DAA 56 DAA Means Means *1 Untreatment control 0 161.4 Application Date: 03/02/91 Spray volume: 100 L/HA

DETL:

(a) Absorbent Granule Formula Ingredient % w/w Perlite SP 412 55 Mica 20 25 Morwet EFW (Napthalene Sulphonate) 10 Ultrazine NA 10 (b) Active Substance Formula Ingredient % w/w Fluazifop-P-butyl 43.4 Tech. grade (88.3% a.i.) Teric 200 12.5 Tween 20 (polyethylene sorbitan 19.8 fatty acid ester) Prosol P12 (mineral oil, ex Caltex) 24.3 (c) Finished Product Composition Component % w/w Absorbent granules 67.3 Active substance formulation 32.7

DETL:

(a) Absorbent Granule Formula Ingredient % w/w Perlite SP 412 55 Mica 20 25 1) Wettol DI 15 2) Wettol NTI 5 (b) Active Substance Formula Ingredient % w/w Cotton seed oil 53 Lambda cyhalothrin, technical 35 grade @ 89.9% a.i. 3) Teric 17A2 10.8 4)

Teric 17A3 1.2 Loading Formula Absorbent granule 84.1% Active substance formulation 15.9% 1) Sodium salt of a phenolsulphonic acid condensation product dispersing agent supplied by BASF. 2) Sodium alkylnapthalene sulphonate wetting agent supplied by BASF. 3) Cetyloleyl alcohol ethoxylate emulsifier supplied by ICI Australia. 4) Cetyloleyl alcohol ethoxylate emulsifier supplied by ICI Australia.

CLPR:
14. A method for preparing water dispersible granules which carry a biologically active substance, said method comprising preparing absorbent water-dispersible granules from a blend of finely divided, water-insoluble filler particles and an organic polymeric dispersing agent which is at least 20% soluble in water, said finely divided filler being selected from the group consisting of mineral earths, clays, silicas and silicates and thereafter absorbing a liquid biologically active substance into said absorbent granules, said biologically active substance having a water-solubility of less than 20 g/liter, the amount of biologically active substance which is absorbed not exceeding the amount that maintains the granule in a free-flowing condition.

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L36: Entry 5 of 5 File: USPT Aug 16, 1994

DOCUMENT-IDENTIFIER: US 5338533 A
TITLE: Controlled release device, and method of preparation

BSPR:
Particular mention may be made of devices suitable for gradually releasing a contact insecticide for protecting animals against parasites, and in particular against ectoparasites. Most of these devices are constituted by an insecticide included in a matrix of plastic material. The slow release of an ectoparasiticide substance (whether in vapor form or by deposition on the hairs of the animal) provides effective protection against parasites for several months.

BSPR:
an insecticide (or mixture of insecticides);

BSPR:
In an advantageous embodiment of said device, the carrier of active principal is advantageously selected from the group comprising: sawdust, natural or synthetic fibers, and mineral fillers such as: barium sulfate, calcium carbonate, zeolites, diatomaceous earths, kaolin, talc, silica, hydrated calcium silicate, antimony trioxide, titanium oxide, and glass microbeads.

DEPR:
Same-sized collars for family pets are prepared by extrusion, the collars containing 15% by weight Diazinon (O,O-diethyl-O-(2-isopropyl-4-methyl-6-pyrimidinyl) phosphorothiorate), 3.5% stabilizers, lubricants, and coloring, isobutyl adipate, polyvinyl chloride (PVC), and a mixture of calcium carbonate and silica carriers of the active principal, in compliance with the manufacturing protocol specified above. Various quantities of carrier can be used, as can be seen from Table I below,

DEPR:
The rate of Diazinon release was determined by causing six collars from each test to be worn by dogs of the beagle race, and a body weight lying in the range 9 kg to 11 kg. A 500 mg collar sample was taken from each animal at various different times and was analyzed by high performance liquid chromatography. Table II below shows the averages of the six values of Diazinon remaining per collar and per batch at various different times:

DEPR:
The results show that the method of the invention facilitates the release of the insecticide. However, it was not possible to make collars without heating the mixture while inserting the insecticide for tests 1, 2, 3, and 4, and thus a portion of the insecticide is used as a plasticizer and as a result total elimination is not obtained, whereas in test 5 which includes an additional quantity of carrier it was possible to incorporate the insecticide cold and to obtain total release of the insecticide, the object of the invention.

DEPR:
In similar manner to Example 1, the following compositions defined in Table III below were made up in the form of collars and insecticide elimination was measured.

DEPR:
In similar manner to Example 1, the following compositions specified in Table V below were made up in the form of collars and insecticide elimination was measured as specified above in Example 2.

DETL:

Diazinon 15% DIBA 11.5% CaCO.sub.3 38% Silica 2% PVC 30.5%

CLPV:

c) cold mixing said plasticized product obtained in b) with between 5% and 80 weight % of at least one carrier of said at least one active agent based on the total weight of resin, plasticizer, active agent carrier and active agent, wherein said at least one carrier is selected from the group consisting of: sawdust, natural or synthetic textile fibers, and mineral fillers including barium sulfate, calcium carbonate, zeolites, diatomaceous earths, kaolin, talc, silica, hydrated calcium silicate, antimony trioxide, titanium oxide, and glass microbeads; said at least one carrier absorbing or adsorbing said at least one active agent in order to regulate the total release of said at least one active agent;

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L6: Entry 1 of 1 File: DWPI Dec 30, 1982

DERWENT-ACC-NO: 1983-02437K
DERWENT-WEEK: 198302

TITLE: Delayed release prepn. contg. e.g. fertiliser or pesticide - prepd. by impregnation of hydrophobised carrier e.g. expanded perlite with soln. of active ingredient and drying

INVENTOR: SCHMIDT, H; SCHOLZE, H

PATENT-ASSIGNEE: FRAUNHOFER-GES FORD ANGE (FRAU)

PRIORITY-DATA: 1981DE-3123938 (June 16, 1981)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
DE 3123938 A	December 30, 1982		015	
DE 3123938 C	March 17, 1983		000	
DK 8202703 A	April 11, 1983		000	
EP 68287 A	January 5, 1983	G	000	

DESIGNATED-STATES: AT BE CH FR GB IT LI NL SE

CITED-DOCUMENTS:DE 1542756; DE 2353125 ; No-SR.Pub ; US 3172752

INT-CL (IPC): A01N 25/08; B01J 20/00; C04B 21/00; C04B 41/28; C05G 3/00; C09K 3/00

ABSTRACTED-PUB-NO: DE 3123938A
BASIC-ABSTRACT:

In a new process for the prodn. of delayed-release preparations based on expanded perlite or similar porous carriers contg. active substances such as fertilizers or pesticides by impregnating the carrier with a concentrated soln. of the active substance and drying the impregnated carrier, (a) the carrier is hydrophobized before impregnation, and (b) the hydrophobized carrier is subjected to vacuum or pressure impregnation with the active substance soln.

Hydrophobizing of the carrier is pref. effected with a silicone oil. Impregnation (which is advantageously repeated one or more times, with drying after each impregnation) is pref. effected with a hot-saturated soln. of the active substance (which may e.g. be a water-soluble fertilizer salt). Vacuum impregnation is pref. carried out at 1-50 mbar. The impregnated carrier particles are advantageously coated, e.g. with poorly soluble phosphate or with a mixt. of phosphates and anhydrite.

The prods. give controlled, prolonged release of the active substance. Prods. having a granular form have improved mechanical stability. Hydrophobizing of the carrier prevents egress of active substance from the pores of the carrier due to capillary or surface forces during drying after the impregnation process.

ABSTRACTED-PUB-NO: DE 3123938C

EQUIVALENT-ABSTRACTS:

In a new process for the prodn. of delayed-release preparations based on expanded perlite or similar porous carriers contg. active substances such as fertilizers or pesticides by impregnating the carrier with a concentrated soln. of the active substance and drying the impregnated carrier, (a) the carrier is hydrophobized before impregnation, and (b) the hydrophobized carrier is subjected to vacuum or pressure impregnation with the active substance soln.

Hydrophobizing of the carrier is pref. effected with a silicone oil. Impregnation (which is advantageously repeated one or more times, with drying after each impregnation) is pref. effected with a hot-saturated soln. of the active substance (which may e.g. be a water-soluble fertilizer salt). Vacuum impregnation is pref. carried out at 1-50 mbar. The impregnated carrier particles are advantageously coated, e.g. with poorly soluble phosphate or with a mixt. of phosphates and anhydrite.

The prods. give controlled, prolonged release of the active substance. Prods. having a granular form have improved mechanical stability. Hydrophobizing of the carrier prevents egress of active substance from the pores of the carrier due to capillary or surface forces during drying after the impregnation process. (15pp)

DERWENT-CLASS: C03 C04
CPI-CODES: C04-D02; C12-M10; C12-M11; C12-N01; C12-N09; C12-N10;

Set Name side by side	Query	Hit Count	Set Name result set
DB=USPT,PGPB,JPAB,EPAB,DWPI; PLUR=YES; OP=ADJ			
L19	l5 and L18	0	L19
L18	l2 and l3 and L17	27	L18
L17	l11 same porous	6104	L17
L16	l2 and l3 and L15	0	L16
L15	l11 same L14	304	L15
L14	porous with carrier$1	18286	L14
L13	l2 and l3 and L12	1	L13
L12	l5 same L11	201	L12
L11	steam	314715	L11
L10	L8 not l9	7	L10
L9	l7 and L8	22	L9
L8	L4 not l6	29	L8
L7	(504 OR 424 OR 514).CLAS.	197656	L7
L6	l4 and L5	1	L6
L5	perlite$1	11263	L5
L4	l1 and l2 and L3	30	L4
L3	fertili$7 or herbicid$6 or insecticid$6 or fungicid$6	219691	L3
L2	control$6 near4 releas$4	119850	L2
L1	(vacuum$3 or pressur$8) near3 impregnat$6	9417	L1

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☐ 1. Document ID: DE 3123938 A DE 3123938 C DK 8202703 A EP 68287 A

L6: Entry 1 of 1 File: DWPI Dec 30, 1982

DERWENT-ACC-NO: 1983-02437K
DERWENT-WEEK: 198302

TITLE: Delayed release prepn. contg. e.g. fertiliser or pesticide - prepd. by impregnation of hydrophobised carrier e.g. expanded perlite with soln. of active ingredient and drying

INVENTOR: SCHMIDT, H; SCHOLZE, H

PRIORITY-DATA: 1981DE-3123938 (June 16, 1981)

PATENT-FAMILY:

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DK 8202703 A	April 11, 1983		000	
EP 68287 A	January 5, 1983	G	000	

INT-CL (IPC): A01N 25/08; B01J 20/00; C04B 21/00; C04B 41/28; C05G 3/00; C09K 3/00

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image

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☐ 1. Document ID: US 20030148999 A1

L9: Entry 1 of 22 File: PGPB Aug 7, 2003

PGPUB-DOCUMENT-NUMBER: 20030148999
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030148999 A1

TITLE: Combinations of active ingredients, which exhibit insecticidal and acaricidal properties

PUBLICATION-DATE: August 7, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Fischer, Reiner	Monheim		DE	
Erdelen, Christoph	Leichlingen		DE	

US-CL-CURRENT: 514/66; 514/232.8, 514/409, 514/424, 514/519

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 2. Document ID: US 20030119806 A1

L9: Entry 2 of 22 File: PGPB Jun 26, 2003

PGPUB-DOCUMENT-NUMBER: 20030119806
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030119806 A1

TITLE: Azetidine derivatives, processes for their preparation and their use as pesticides

PUBLICATION-DATE: June 26, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Lindell, Stephen	Kelkheim-Fischbach		DE	
Dickhaut, Joachim	Heidelberg		DE	
Jakobi, Harald	Frankfurt		DE	
Tiebes, Jorg	Frankfurt		DE	
Hempel, Waltraud	Liederbach		DE	
Jans, Daniela	Bad Homburg v. d. H.		DE	
Waibel, Jutta Maria	Frankfurt		DE	

US-CL-CURRENT: 514/210.01; 514/210.2, 546/268.1, 548/950

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 3. Document ID: US 20030114312 A1

L9: Entry 3 of 22 File: PGPB Jun 19, 2003

PGPUB-DOCUMENT-NUMBER: 20030114312
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030114312 A1

TITLE: Combinations of active ingredients with insecticidal and acaricidal properties

PUBLICATION-DATE: June 19, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Fischer, Reiner	Monheim		DE	
Erdelen, Christoph	Leichlingen		DE	
Bretschneider, Thomas	Lohmar		DE	

US-CL-CURRENT: 504/299

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 4. Document ID: US 20030100604 A1

L9: Entry 4 of 22 File: PGPB May 29, 2003

PGPUB-DOCUMENT-NUMBER: 20030100604
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030100604 A1

TITLE: Active substance combinations having insecticidal and acaricidal properties

PUBLICATION-DATE: May 29, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Fischer, Reiner	Monheim		DE	
Erdelen, Christoph	Leichlingen		DE	
Bretschneider, Thomas	Lohmar		DE	

US-CL-CURRENT: 514/473; 514/444

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 5. Document ID: US 20030083371 A1

L9: Entry 5 of 22 File: PGPB May 1, 2003

PGPUB-DOCUMENT-NUMBER: 20030083371
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030083371 A1

TITLE: Active substance combinations comprising insecticidal and acaricidal properties

PUBLICATION-DATE: May 1, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Fischer, Reiner	Monheim		DE	
Bretschneider, Thomas	Lohmar		DE	
Erdelen, Christoph	Leichlingen		DE	

US-CL-CURRENT: 514/473

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 6. Document ID: US 20020001618 A1

L9: Entry 6 of 22 File: PGPB Jan 3, 2002

PGPUB-DOCUMENT-NUMBER: 20020001618
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020001618 A1

TITLE: Controlled release compositions

PUBLICATION-DATE: January 3, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Dai, David Junhui	Lansdale	PA	US	
Willingham, Gary Lewis	Glenside	PA	US	

US-CL-CURRENT: 424/468; 514/372

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 7. Document ID: US 6610282 B1

L9: Entry 7 of 22 File: USPT Aug 26, 2003

US-PAT-NO: 6610282
DOCUMENT-IDENTIFIER: US 6610282 B1

TITLE: Polymeric controlled release compositions

DATE-ISSUED: August 26, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Ghosh; Tirthankar	Oreland	PA		

US-CL-CURRENT: 424/78.09; 424/405, 424/408, 424/409, 424/411, 424/413, 424/486, 424/76.8, 424/78.07, 424/78.31, 424/78.36, 514/372, 514/373, 514/478, 514/492, 514/525, 523/122, 523/132

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 8. Document ID: US 6576661 B1

L9: Entry 8 of 22 File: USPT Jun 10, 2003

US-PAT-NO: 6576661
DOCUMENT-IDENTIFIER: US 6576661 B1

TITLE: Active ingredient combination having insecticidal and acaricidal characteristics

DATE-ISSUED: June 10, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Bruck; Ernst	Bergisch Gladbach			DE
Erdelen; Christoph	Leichlingen			DE
Fischer; Reiner	Monheim			DE

US-CL-CURRENT: 514/462

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 9. Document ID: US 6565867 B1

L9: Entry 9 of 22 File: USPT May 20, 2003

US-PAT-NO: 6565867
DOCUMENT-IDENTIFIER: US 6565867 B1

TITLE: Animal repellent compositions and methods of use thereof

DATE-ISSUED: May 20, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
O'Leary; Robert K.	Deltaville	VA		

US-CL-CURRENT: 424/405; 424/418, 424/725, 424/753, 424/78.08

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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☐ 10. Document ID: US 6221374 B1

L9: Entry 10 of 22 File: USPT Apr 24, 2001

US-PAT-NO: 6221374
DOCUMENT-IDENTIFIER: US 6221374 B1
**** See image for Certificate of Correction ****

TITLE: Controlled release compositions

DATE-ISSUED: April 24, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Ghosh; Tirthankar	Oreland	PA		
Nungesser; Edwin H.	Horsham	PA		

US-CL-CURRENT: 424/405; 424/406, 424/407, 424/411, 514/372, 514/731, 514/734

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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Search Results - Record(s) 11 through 20 of 22 returned.

☐ 11. Document ID: US 6090399 A

L9: Entry 11 of 22 File: USPT Jul 18, 2000

US-PAT-NO: 6090399
DOCUMENT-IDENTIFIER: US 6090399 A

TITLE: Controlled release composition incorporating metal oxide glass comprising biologically active compound

DATE-ISSUED: July 18, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Ghosh; Tirthankar	Oreland	PA		
Nungesser; Edwin Hugh	Horsham	PA		

US-CL-CURRENT: 424/409; 424/405, 424/484

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

☐ 12. Document ID: US 5948385 A

L9: Entry 12 of 22 File: USPT Sep 7, 1999

US-PAT-NO: 5948385
DOCUMENT-IDENTIFIER: US 5948385 A
**** See image for Certificate of Correction ****

TITLE: Antimicrobial materials

DATE-ISSUED: September 7, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Chapman; John R.	Lake Villa	IL		
Lo; Ying-Cheng	Green Oaks	IL		
Kubey; Winnie	Buffalo Grove	IL		
Holmes; Clifford J.	Glenview	IL		
Bell; David	Grayslake	IL		

US-CL-CURRENT: 424/1.29; 424/1.33, 424/1.37, 424/404

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

☐ 13. Document ID: US 5925368 A

L9: Entry 13 of 22 File: USPT Jul 20, 1999

US-PAT-NO: 5925368
DOCUMENT-IDENTIFIER: US 5925368 A
**** See image for Certificate of Correction ****

TITLE: Protection of wooden objects in direct contact with soil from pest invasion

DATE-ISSUED: July 20, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Voris; Peter Van	Richland	WA		
Skiens; W. Eugene	Wilsonville	OR		
Burton; Frederick G.	Stansbury Park	UT		
Cataldo; Dominic A.	Kennewick	WA		

US-CL-CURRENT: 424/405; 424/406, 424/407, 424/408, 424/409, 424/412, 424/417, 424/419, 424/421, 424/484, 424/487, 424/DIG.8

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 14. Document ID: US 5855654 A

L9: Entry 14 of 22 File: USPT Jan 5, 1999

US-PAT-NO: 5855654
DOCUMENT-IDENTIFIER: US 5855654 A

TITLE: Pyridazinones as marine antifouling agents

DATE-ISSUED: January 5, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Willingham; Gary Lewis	Glenside	PA		
Sherba; Samuel Eugene	Willingboro	NJ		
Lange; Barry Clifford	Lansdale	PA		
Michelotti; Enrique Luis	Fort Washington	PA		

US-CL-CURRENT: 106/18.32; 106/18.3, 106/18.33, 106/18.34, 106/18.35, 424/405, 424/630, 424/78.09, 514/241, 514/247, 514/248, 514/252.05, 514/345, 514/372, 514/396, 514/417, 514/479, 514/493, 514/494, 514/500, 514/595, 514/600, 514/64, 514/706, 514/709, 523/122, 523/179

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 15. Document ID: US 5431921 A

L9: Entry 15 of 22 File: USPT Jul 11, 1995

US-PAT-NO: 5431921
DOCUMENT-IDENTIFIER: US 5431921 A

TITLE: Dispensing device containing a hydrophobic medium

DATE-ISSUED: July 11, 1995

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Thombre; Avinash G.	Gales Ferry	CT		

US-CL-CURRENT: 424/424; 424/425, 424/426, 424/438, 424/461, 424/462, 424/473, 424/480, 424/482, 424/494, 424/495, 424/497

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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☐ 16. Document ID: US 5162367 A

L9: Entry 16 of 22 File: USPT Nov 10, 1992

US-PAT-NO: 5162367
DOCUMENT-IDENTIFIER: US 5162367 A

TITLE: Pesticidal compounds

DATE-ISSUED: November 10, 1992

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Blade; Robert J.	Berkhamsted			GB2
Robinson; John E.	Berkhamsted			GB2

US-CL-CURRENT: 514/465; 514/467, 514/521, 514/618, 514/622, 549/441, 549/452, 554/42, 554/45, 554/61, 554/62, 554/64, 554/65, 558/389, 564/162, 564/170, 564/172, 564/174

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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☐ 17. Document ID: US 5124348 A

L9: Entry 17 of 22 File: USPT Jun 23, 1992

US-PAT-NO: 5124348
DOCUMENT-IDENTIFIER: US 5124348 A

TITLE: Pesticidal amides

DATE-ISSUED: June 23, 1992

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Black; Malcolm H.	Berkhamsted			GB2
Blade; Robert J.	Berkhamsted			GB2
Peek; Robert J.	Berkhamsted			GB2

US-CL-CURRENT: 514/438; 514/456, 514/467, 514/469, 514/517, 514/604, 514/605, 514/606, 514/608, 549/398, 549/399, 549/407, 549/408, 549/452, 549/466, 549/471, 549/62, 549/65, 549/77, 558/49, 558/61, 558/62, 560/307, 560/310, 564/100, 564/101, 564/102, 564/91

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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☐ 18. Document ID: US 5091420 A

L9: Entry 18 of 22 File: USPT Feb 25, 1992

US-PAT-NO: 5091420
DOCUMENT-IDENTIFIER: US 5091420 A

TITLE: Method of combatting pests using N-(cyclo)alkyl-5-substituted-2,4-thiopentadienamide compounds

DATE-ISSUED: February 25, 1992

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Blade; Robert J.	Berkhamsted			GB2
Peek; Robert J.	Berkhamsted			GB2

US-CL-CURRENT: 514/599; 564/74, 564/78

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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☐ 19. Document ID: US 5091414 A

L9: Entry 19 of 22 File: USPT Feb 25, 1992

US-PAT-NO: 5091414
DOCUMENT-IDENTIFIER: US 5091414 A

TITLE: Pesticidal compounds

DATE-ISSUED: February 25, 1992

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Black; Malcolm H.	Berkhamsted			GB2
Blade; Robert J.	Berkhamsted			GB2
Peek; Robert J.	Berkhamsted			GB2

US-CL-CURRENT: 514/478; 514/485, 514/487, 560/13, 560/148, 560/16

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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☐ 20. Document ID: US 5057504 A

L9: Entry 20 of 22 File: USPT Oct 15, 1991

US-PAT-NO: 5057504
DOCUMENT-IDENTIFIER: US 5057504 A

TITLE: 1-heterocyclic bicyclo-octanes

DATE-ISSUED: October 15, 1991

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Black; Malcolm H.	Berkhamsted			GB2
Wyatt; John A.	Berkhamsted			GB2
Weston; John B.	Berkhamsted			GB2
Larkin; John P.	Berkhamsted			GB2
Smith; Ian H.	Berkhamsted			GB2
Pulman; David A.	Berkhamsted			GB2

US-CL-CURRENT: 514/63; 514/149, 514/321, 514/338, 514/427, 514/452, 546/14, 546/197, 546/282.4, 548/406, 548/542, 548/543, 548/556, 548/557, 548/558, 548/560, 548/561, 548/562

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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Search Results - Record(s) 21 through 22 of 22 returned.

☐ 21. Document ID: US 5037813 A

L9: Entry 21 of 22 File: USPT Aug 6, 1991

US-PAT-NO: 5037813
DOCUMENT-IDENTIFIER: US 5037813 A

TITLE: N-alkyl-N-[1,3-butadienyl(thio)carbonyl]-(thio) phosphoramidates, compositions, and methods of use as pesticides

DATE-ISSUED: August 6, 1991

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Black; Malcolm H.	Berkhamsted			GB2
Blade; Robert J.	Berkhamsted			GB2
Peek; Robert J.	Berkhamsted			GB2

US-CL-CURRENT: 514/120; 558/151, 558/178

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 22. Document ID: US 4585795 A

L9: Entry 22 of 22 File: USPT Apr 29, 1986

US-PAT-NO: 4585795
DOCUMENT-IDENTIFIER: US 4585795 A

TITLE: Control agent for protecting timber against fungi employing a mixture of an organic carboxylic acid salt and quaternary ammonium salt

DATE-ISSUED: April 29, 1986

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Linderborg; Irma	Kuusankoski			FI

US-CL-CURRENT: 514/558; 514/557

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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Search Results - Record(s) 1 through 7 of 7 returned.

☐ 1. Document ID: US 6329465 B1

L10: Entry 1 of 7 File: USPT Dec 11, 2001

US-PAT-NO: 6329465
DOCUMENT-IDENTIFIER: US 6329465 B1

TITLE: Ethylene copolymer composition and uses thereof

DATE-ISSUED: December 11, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Takahashi; Mamoru	Yamaguchi			JP
Nakagawa; Takashi	Yamaguchi			JP
Sugimura; Kenji	Yamaguchi			JP
Yoshitsugu; Ken	Yamaguchi			JP

US-CL-CURRENT: 525/191; 525/240

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 2. Document ID: US 6235403 B1

L10: Entry 2 of 7 File: USPT May 22, 2001

US-PAT-NO: 6235403
DOCUMENT-IDENTIFIER: US 6235403 B1

TITLE: Process of treating wood with preservative

DATE-ISSUED: May 22, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Vinden; Peter	Victoria			AU
Cobham; Peter R. S.	Victoria			AU
Romero; Francisco J.	Victoria			AU

US-CL-CURRENT: 428/537.1; 427/297, 427/298, 427/317, 427/325, 427/351, 427/393, 427/397, 427/440, 427/441

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 3. Document ID: US 6207228 B1

L10: Entry 3 of 7 File: USPT Mar 27, 2001

US-PAT-NO: 6207228
DOCUMENT-IDENTIFIER: US 6207228 B1

TITLE: Concurrent fragmentation and impregnation machine and processing

DATE-ISSUED: March 27, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Hundt; Vincent G.	Coon Valley	WI	54623	
Peltz; Frederick G.	St. Martin	MN	56376	

US-CL-CURRENT: 427/213; 118/303, 427/212, 427/424, 427/426

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 4. Document ID: US 6123795 A

L10: Entry 4 of 7 File: USPT Sep 26, 2000

US-PAT-NO: 6123795
DOCUMENT-IDENTIFIER: US 6123795 A

TITLE: Method of preparing a sheet of a lignocellulosic material for the manufacture of a finished product and method of manufacture of a finished product

DATE-ISSUED: September 26, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Symons; Michael Windsor	Pretoria			ZA

US-CL-CURRENT: 156/79; 156/222, 156/306.9, 156/314, 156/331.3, 156/331.7, 162/136, 427/391, 427/393

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 5. Document ID: US 5101071 A

L10: Entry 5 of 7 File: USPT Mar 31, 1992

US-PAT-NO: 5101071
DOCUMENT-IDENTIFIER: US 5101071 A

TITLE: Pesticidal compounds

DATE-ISSUED: March 31, 1992

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Blade; Robert J.	Berkhamsted			GB2
Peek; Robert J.	Berkhamsted			GB2

US-CL-CURRENT: 564/74; 564/78

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 6. Document ID: US 4765837 A

L10: Entry 6 of 7 File: USPT Aug 23, 1988

US-PAT-NO: 4765837
DOCUMENT-IDENTIFIER: US 4765837 A

TITLE: Alloy and product made therefrom

DATE-ISSUED: August 23, 1988

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Whitehead; Derek J.	Poynton, Cheshire			GB2

US-CL-CURRENT: 75/249; 419/66, 420/408, 420/411

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 7. Document ID: US 3873734 A

L10: Entry 7 of 7 File: USPT Mar 25, 1975

US-PAT-NO: 3873734
DOCUMENT-IDENTIFIER: US 3873734 A
**** See image for Certificate of Correction ****

TITLE: Method of producing a pelleted slow-release NPN feed for ruminants

DATE-ISSUED: March 25, 1975

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Higgins; John Francis	Schuyler	NB		
McDonald; Dale Richard	Sterling	CO		
Hanson; Marvin Ardell	Ceresco	NB		
Moore; William Percy	Chester	VA		

US-CL-CURRENT: 426/69; 426/623, 426/636, 426/807, 71/11, 71/29

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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Search Results - Record(s) 1 through 1 of 1 returned.

☐ 1. Document ID: US 20020098983 A1

L13: Entry 1 of 1 File: PGPB Jul 25, 2002

PGPUB-DOCUMENT-NUMBER: 20020098983
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020098983 A1

TITLE: Controlled release agricultural products and processes for making same

PUBLICATION-DATE: July 25, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Pursell, Taylor	Birmingham	AL	US	
Shirley, Arthur R. JR.	Florence	AL	US	
Cochran, Keith D.	Killen	AL	US	
Holt, Timothy G.	Florence	AL	US	
Pedeen, Gregory S.	Killen	AL	US	

US-CL-CURRENT: 504/367

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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Search Results - Record(s) 1 through 10 of 27 returned.

☐ 1. Document ID: US 20030148894 A1

L18: Entry 1 of 27 File: PGPB Aug 7, 2003

PGPUB-DOCUMENT-NUMBER: 20030148894
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030148894 A1

TITLE: In situ thermal processing of an oil shale formation using a natural distributed combustor

PUBLICATION-DATE: August 7, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Vinegar, Harold J.	Houston	TX	US	
Coles, John Matthew	Katy	TX	US	
de Rouffignac, Eric Pierre	Houston	TX	US	
Karanikas, John Michael	Houston	TX	US	
Menotti, James Louis	Dickinson	TX	US	
Van Hardeveld, Robert Martijn	Amsterdam	TX	NL	
Wellington, Scott Lee	Bellaire		US	

US-CL-CURRENT: 507/200

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

☐ 2. Document ID: US 20030146002 A1

L18: Entry 2 of 27 File: PGPB Aug 7, 2003

PGPUB-DOCUMENT-NUMBER: 20030146002
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030146002 A1

TITLE: Removable heat sources for in situ thermal processing of an oil shale formation

PUBLICATION-DATE: August 7, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Vinegar, Harold J.	Houston	TX	US	
Carl, Fredrick Gordon JR.	Houston	TX	US	
Coles, John Matthew	Katy	TX	US	
Rouffignac, Eric Pierre de	Houston	TX	US	
Hunsucker, Bruce Gerard	Katy	TX	US	
Menotti, James Louis	Dickinson	TX	US	
Wellington, Scott Lee	Bellaire	TX	US	

US-CL-CURRENT: 166/384

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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☐ 3. Document ID: US 20030142964 A1

L18: Entry 3 of 27 File: PGPB Jul 31, 2003

PGPUB-DOCUMENT-NUMBER: 20030142964
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030142964 A1

TITLE: In situ thermal processing of an oil shale formation using a controlled heating rate

PUBLICATION-DATE: July 31, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Wellington, Scott Lee	Bellaire	TX	US	
Berchenko, Ilya Emil	Friendswood	TX	US	
Rouffignac, Eric Pierre de	Houston	TX	US	
Fowler, Thomas David	Houston	TX	US	
Ryan, Robert Charles	Houston	TX	US	
Shahin, Gordon Thomas JR.	Bellaire	TX	US	
Stegemeier, George Leo	Houston	TX	US	
Vinegar, Harold J.	Houston	TX	US	
Zhang, Etuan	Houston	TX	US	

US-CL-CURRENT: 392/301

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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☐ 4. Document ID: US 20030141068 A1

L18: Entry 4 of 27 File: PGPB Jul 31, 2003

PGPUB-DOCUMENT-NUMBER: 20030141068
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030141068 A1

TITLE: In situ thermal processing through an open wellbore in an oil shale formation

PUBLICATION-DATE: July 31, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Pierre de Rouffignac, Eric	Houston	TX	US	
Berchenko, Ilya Emil	Friendswood	TX	US	
Fowler, Thomas David	Katy	TX	US	
Hunsucker, Bruce Gerard	Katy	TX	US	
Karanikas, John Michael	Houston	TX	US	
Keedy, Charles Robert	Houston	TX	US	
Ryan, Robert Charles	Houston	TX	US	
Vinegar, Harold J.	Houston	TX	US	
Wellington, Scott Lee	Bellaire	TX	US	
Zhang, Etuan	Houston	TX	US	

US-CL-CURRENT: 166/302; 166/60

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 5. Document ID: US 20030141067 A1

L18: Entry 5 of 27 File: PGPB Jul 31, 2003

PGPUB-DOCUMENT-NUMBER: 20030141067
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030141067 A1

TITLE: In situ thermal processing of an oil shale formation to increase permeability of the formation

PUBLICATION-DATE: July 31, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Rouffignac, Eric Pierre de	Houston	TX	US	
Berchenko, Ilya Emil	Friendswod	TX	US	
Fowler, Thomas David	Houston	TX	US	
Ryan, Robert Charles	Houston	TX	US	
Shahin, Gordon Thomas JR.	Bellaire	TX	US	
Stegemeier, George Leo	Houston	TX	US	
Vinegar, Harold J.	Houston	TX	US	
Wellington, Scott Lee	Bellaire	TX	US	
Zhang, Etuan	Houston	TX	US	

US-CL-CURRENT: 166/302; 166/60

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 6. Document ID: US 20030141066 A1

L18: Entry 6 of 27 File: PGPB Jul 31, 2003

PGPUB-DOCUMENT-NUMBER: 20030141066
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030141066 A1

TITLE: In situ thermal processing of an oil shale formation while inhibiting coking

PUBLICATION-DATE: July 31, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Karanikas, John Michael	Houston	TX	US	
de Rouffignac, Eric Pierre	Houston	TX	US	
Vinegar, Harold J.	Houston	TX	US	
Wellington, Scott Lee	Bellaire	TX	US	

US-CL-CURRENT: 166/302; 166/60

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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☐ 7. Document ID: US 20030137181 A1

L18: Entry 7 of 27 File: PGPB Jul 24, 2003

PGPUB-DOCUMENT-NUMBER: 20030137181
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030137181 A1

TITLE: In situ thermal processing of an oil shale formation to produce hydrocarbons having a selected carbon number range

PUBLICATION-DATE: July 24, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Wellington, Scott Lee	Bellaire	TX	US	
Berchenko, Ilya Emil	Friendswood	TX	US	
Rouffignac, Eric Pierre de	Houston	TX	US	
Fowler, Thomas David	Houston	TX	US	
Ryan, Robert Charles	Houston	TX	US	
Shahin, Gordon Thomas JR.	Bellaire	TX	US	
Stegemeier, George Leo	Houston	TX	US	
Vinegar, Harold J.	Houston	TX	US	
Zhang, Etuan	Houston	TX	US	

US-CL-CURRENT: 299/5

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

☐ 8. Document ID: US 20030136559 A1

L18: Entry 8 of 27 File: PGPB Jul 24, 2003

PGPUB-DOCUMENT-NUMBER: 20030136559
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030136559 A1

TITLE: In situ thermal processing while controlling pressure in an oil shale formation

PUBLICATION-DATE: July 24, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Wellington, Scott Lee	Bellaire	TX	US	
Berchenko, Ilya Emil	Friendswood	TX	US	
Rouffignac, Eric Pierre de	Houston	TX	US	
Fowler, Thomas David	Houston	TX	US	
Ryan, Robert Charles	Houston	TX	US	
Shahin, Gordon Thomas JR.	Bellaire	TX	US	
Stegemeier, George Leo	Houston	TX	US	
Vinegar, Harold J.	Houston	TX	US	
Zhang, Etuan	Houston	TX	US	

US-CL-CURRENT: 166/250.01

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

☐ 9. Document ID: US 20030136558 A1

L18: Entry 9 of 27 File: PGPB Jul 24, 2003

PGPUB-DOCUMENT-NUMBER: 20030136558
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030136558 A1

TITLE: In situ thermal processing of an oil shale formation to produce a desired product

PUBLICATION-DATE: July 24, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Wellington, Scott Lee	Bellaire	TX	US	
Berchenko, Ilya Emil	Friendswood	TX	US	
Rouffignac, Eric Pierre de	Houston	TX	US	
Fowler, Thomas David	Houston	TX	US	
Ryan, Robert Charles	Houston	TX	US	
Shahin, Gordon Thomas JR.	Bellaire	TX	US	
Stegemeier, George Leo	Houston	TX	US	
Vinegar, Harold J.	Houston	TX	US	
Zhang, Etuan	Houston	TX	US	

US-CL-CURRENT: 166/245

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 10. Document ID: US 20030131996 A1

L18: Entry 10 of 27 File: PGPB Jul 17, 2003

PGPUB-DOCUMENT-NUMBER: 20030131996
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030131996 A1

TITLE: In situ thermal processing of an oil shale formation having permeable and impermeable sections

PUBLICATION-DATE: July 17, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Vinegar, Harold J.	Houston	TX	US	
Rouffignac, Eric Pierre de	Houston	TX	US	
Wellington, Scott Lee	Bellaire	TX	US	

US-CL-CURRENT: 166/272.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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Search Results - Record(s) 11 through 20 of 27 returned.

☐ 11. Document ID: US 20030131994 A1

L18: Entry 11 of 27 File: PGPB Jul 17, 2003

PGPUB-DOCUMENT-NUMBER: 20030131994
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030131994 A1

TITLE: In situ thermal processing and solution mining of an oil shale formation

PUBLICATION-DATE: July 17, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Vinegar, Harold J.	Houston	TX	US	
Rouffignac, Eric Pierre de	Houston	TX	US	
Maher, Kevin Albert	Bellaire	TX	US	
Schoeling, Lanny Gene	Katy	TX	US	
Wellington, Scott Lee	Bellaire	TX	US	

US-CL-CURRENT: 166/256

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

☐ 12. Document ID: US 20030131993 A1

L18: Entry 12 of 27 File: PGPB Jul 17, 2003

PGPUB-DOCUMENT-NUMBER: 20030131993
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030131993 A1

TITLE: In situ thermal processing of an oil shale formation with a selected property

PUBLICATION-DATE: July 17, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Zhang, Etuan	Houston	TX	US	
Berchenko, Ilya Emil	Friendswood	TX	US	
Rouffignac, Eric Pierre de	Houston	TX	US	
Fowler, Thomas David	Houston	TX	US	
Maher, Kevin Albert	Bellaire	TX	US	
Ryan, Robert Charles	Houston	TX	US	
Shahin, Gordon Thomas JR.	Bellaire	TX	US	
Stegemeier, George Leo	Houston	TX	US	
Vinegar, Harold J.	Houston	TX	US	
Wellington, Scott Lee	Bellaire	TX	US	

US-CL-CURRENT: 166/256

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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☐ 13. Document ID: US 20030116315 A1

L18: Entry 13 of 27 File: PGPB Jun 26, 2003

PGPUB-DOCUMENT-NUMBER: 20030116315
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030116315 A1

TITLE: In situ thermal processing of a relatively permeable formation

PUBLICATION-DATE: June 26, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Wellington, Scott Lee	Bellaire	TX	US	
de Rouffignac, Eric Pierre	Houston	TX	US	
Karanikas, John Michael	Houston	TX	US	
Maher, Kevin Albert	Bellaire	TX	US	
Messier, Margaret Ann	Calgary	TX	CA	
Roberts, Bruce Edmunds	Calgary	TX	CA	
Sumnu-Dindoruk, Meliha Deniz	Houston		US	
Vinegar, Harold J.	Houston		US	

US-CL-CURRENT: 166/256

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 14. Document ID: US 20030111223 A1

L18: Entry 14 of 27 File: PGPB Jun 19, 2003

PGPUB-DOCUMENT-NUMBER: 20030111223
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030111223 A1

TITLE: In situ thermal processing of an oil shale formation using horizontal heat sources

PUBLICATION-DATE: June 19, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Rouffignac, Eric Pierre de	Houston	TX	US	
Berchenko, Ilya Emil	Friendswood	TX	US	
Fowler, Thomas David	Houston	TX	US	
Karanikas, John Michael	Houston	TX	US	
Maher, Kevin Albert	Bellaire	TX	US	
Ryan, Robert Charles	Houston	TX	US	
Shahin, Gordon Thomas JR.	Bellaire	TX	US	
Vinegar, Harold J.	Houston	TX	US	
Wellington, Scott Lee	Bellaire	TX	US	
Zhang, Etuan	Houston	TX	US	

US-CL-CURRENT: 166/256; 166/302, 166/59, 166/60

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 15. Document ID: US 20030102130 A1

L18: Entry 15 of 27 File: PGPB Jun 5, 2003

PGPUB-DOCUMENT-NUMBER: 20030102130
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030102130 A1

TITLE: In situ thermal recovery from a relatively permeable formation with quality control

PUBLICATION-DATE: June 5, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Vinegar, Harold J.	Houston	TX	US	
Sumnu-Dindoruk, Meliha Deniz	Houston	TX	US	
Wellington, Scott Lee	Bellaire	TX	US	

US-CL-CURRENT: 166/302; 166/303, 166/60

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 16. Document ID: US 20030102126 A1

L18: Entry 16 of 27 File: PGPB Jun 5, 2003

PGPUB-DOCUMENT-NUMBER: 20030102126

PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030102126 A1

TITLE: In situ thermal recovery from a relatively permeable formation with controlled production rate

PUBLICATION-DATE: June 5, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Sumnu-Dindoruk, Meliha Deniz	Houston	TX	US	
de Rouffignac, Eric Pierre	Houston	TX	US	
Karanikas, John Michael	Houston	TX	US	
Vinegar, Harold J.	Houston	TX	US	
Wellington, Scott Lee	Bellaire	TX	US	

US-CL-CURRENT: 166/272.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 17. Document ID: US 20030102125 A1

L18: Entry 17 of 27 File: PGPB Jun 5, 2003

PGPUB-DOCUMENT-NUMBER: 20030102125
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030102125 A1

TITLE: In situ thermal processing of a relatively permeable formation in a reducing environment

PUBLICATION-DATE: June 5, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Wellington, Scott Lee	Bellaire	TX	US	
Berchenko, Ilya Emil	Friendswood	TX	US	
Rouffignac, Eric Pierre de	Houston	TX	US	
Fowler, Thomas David	Houston	TX	US	
Ryan, Robert Charles	Houston	TX	US	
Shahin, Gordon Thomas JR.	Bellaire	TX	US	
Stegemeier, George Leo	Houston	TX	US	
Vinegar, Harold J.	Houston	TX	US	
Zhang, Etuan	Houston	TX	US	

US-CL-CURRENT: 166/266

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 18. Document ID: US 20030102124 A1

L18: Entry 18 of 27 File: PGPB Jun 5, 2003

PGPUB-DOCUMENT-NUMBER: 20030102124
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030102124 A1

TITLE: In situ thermal processing of a blending agent from a relatively permeable formation

PUBLICATION-DATE: June 5, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Vinegar, Harold J.	Houston	TX	US	
Rouffignac, Eric Pierre de	Houston	TX	US	
Karanikas, John Michael	Houston	TX	US	
Sumnu-Dindoruk, Meliha Deniz	Houston	TX	US	
Wellington, Scott Lee	Bellaire	TX	US	

US-CL-CURRENT: 166/256

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 19. Document ID: US 20030100451 A1

L18: Entry 19 of 27 File: PGPB May 29, 2003

PGPUB-DOCUMENT-NUMBER: 20030100451
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030100451 A1

TITLE: In situ thermal recovery from a relatively permeable formation with backproduction through a heater wellbore

PUBLICATION-DATE: May 29, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Messier, Margaret Ann	Calgary	TX	CA	
Crane, Steven Dexter	Richardson	TX	US	
Rouffignac, Eric Pierre de	Houston	TX	US	
Karanikas, John Michael	Houston	TX	US	
Maher, Kevin Albert	Bellaire	TX	US	
Sumnu-Dindoruk, Meliha Deniz	Houston	TX	US	
Roberts, Bruce Edmunds	Calgary	TX	CA	
Vinegar, Harold J.	Houston		US	
Wellington, Scott Lee	Bellaire		US	

US-CL-CURRENT: 507/100

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 20. Document ID: US 20030098605 A1

L18: Entry 20 of 27 File: PGPB May 29, 2003

PGPUB-DOCUMENT-NUMBER: 20030098605
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030098605 A1

TITLE: In situ thermal recovery from a relatively permeable formation

PUBLICATION-DATE: May 29, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Vinegar, Harold J.	Houston	TX	US	
Rouffignac, Eric Pierre de	Houston	TX	US	
Karanikas, John Michael	Houston	TX	US	
Sumnu-Dindoruk, Meliha Deniz	Houston	TX	US	
Wellington, Scott Lee	Bellaire	TX	US	

US-CL-CURRENT: 166/302; 166/256

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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Search Results - Record(s) 21 through 27 of 27 returned.

☐ 21. Document ID: US 20030098149 A1

L18: Entry 21 of 27 File: PGPB May 29, 2003

PGPUB-DOCUMENT-NUMBER: 20030098149
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030098149 A1

TITLE: In situ thermal recovery from a relatively permeable formation using gas to increase mobility

PUBLICATION-DATE: May 29, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Wellington, Scott Lee	Bellaire	TX	US	
Crane, Steven Dexter	Richardson	TX	US	
Rouffignac, Eric Pierre de	Houston	TX	US	
Karanikas, John Michael	Houston	TX	US	
Maher, Kevin Albert	Bellaire	TX	US	
Messier, Margaret Ann	Alberta	TX	CA	
Roberts, Bruce Edmunds	Alberta	TX	CA	
Sumnu-Dindoruk, Meliha Deniz	Houston		US	
Vinegar, Harold J.	Houston		US	

US-CL-CURRENT: 166/52

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 22. Document ID: US 20030080604 A1

L18: Entry 22 of 27 File: PGPB May 1, 2003

PGPUB-DOCUMENT-NUMBER: 20030080604
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030080604 A1

TITLE: In situ thermal processing and inhibiting migration of fluids into or out of an in situ oil shale formation

PUBLICATION-DATE: May 1, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Vinegar, Harold J.	Houston	TX	US	
Aymond, Dannie Antoine JR.	Houston	TX	US	
Maher, Kevin Albert	Bellaire	TX	US	
McKinzie, Billy John II	Houston	TX	US	
Palfreyman, Bruce Donald	Houston	TX	US	
Stegemeier, George Leo	Houston	TX	US	
Ward, John Michael	Katy	TX	US	
Watkins, Ronnie Wade	Cypress	TX	US	
Wellington, Scott Lee	Bellaire	TX	US	

US-CL-CURRENT: 299/14; 166/256, 166/272.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 23. Document ID: US 20020017310 A1

L18: Entry 23 of 27 File: PGPB Feb 14, 2002

PGPUB-DOCUMENT-NUMBER: 20020017310
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020017310 A1

TITLE: Semi-enclosed applicator for distributing a subtance onto a target surface

PUBLICATION-DATE: February 14, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Gruenbacher, Dana P.	Fairfield	OH	US	
Davis, James H.	Middletown	OH	US	
Fields, Kevin J.	Cincinnati	OH	US	
Manske, Thomas J. JR.	Mason	OH	US	
Joseph, Gary C.	Cincinnati	OH	US	
Zaveri, Piyush N.	Mason	OH	US	

US-CL-CURRENT: 132/320

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☑ 24. Document ID: US 6080221 A

L18: Entry 24 of 27 File: USPT Jun 27, 2000

US-PAT-NO: 6080221
DOCUMENT-IDENTIFIER: US 6080221 A

TITLE: Vacuum coated particulate fertilizers

DATE-ISSUED: June 27, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Moore; William P.	Hopewell	VA		

US-CL-CURRENT: 71/11; 71/18, 71/27, 71/28, 71/31, 71/33, 71/34, 71/63, 71/64.07

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 25. Document ID: US 4528011 A

L18: Entry 25 of 27 File: USPT Jul 9, 1985

US-PAT-NO: 4528011
DOCUMENT-IDENTIFIER: US 4528011 A

TITLE: Immobilization of radwastes in glass containers and products formed thereby

DATE-ISSUED: July 9, 1985

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Macedo; Pedro B.	Bethesda	MD	20034	
Simmons; Catherine J.	Bethesda	MD		
Tran; Danh C.	Rockville	MD		
Lagakos; Nicholas	Silver Spring	MD		
Simmons; Joseph	Bethesda	MD		

US-CL-CURRENT: 65/30.13; 65/30.14, 976/DIG.385, 976/DIG.394

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 26. Document ID: US 4312774 A

L18: Entry 26 of 27 File: USPT Jan 26, 1982

US-PAT-NO: 4312774
DOCUMENT-IDENTIFIER: US 4312774 A

TITLE: Immobilization of radwastes in glass containers and products formed thereby

DATE-ISSUED: January 26, 1982

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Macedo; Pedro B.	Bethesda	MD	20034	
Simmons; Catherine J.	Bethesda	MD		
Tran; Danh C.	Rockville	MD		
Lagakos; Nicholas	Silver Spring	MD		
Simmons; Joseph	Bethesda	MD		

US-CL-CURRENT: 588/12; 264/.5, 588/16, 976/DIG.385, 976/DIG.394

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 27. Document ID: US 3969398 A

L18: Entry 27 of 27 File: USPT Jul 13, 1976

US-PAT-NO: 3969398
DOCUMENT-IDENTIFIER: US 3969398 A

TITLE: Process for producing N-phosphonomethyl glycine

DATE-ISSUED: July 13, 1976

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Hershman; Arnold	Creve Coeur	MO		

US-CL-CURRENT: 562/17; 987/168

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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L18: Entry 24 of 27 File: USPT Jun 27, 2000

DOCUMENT-IDENTIFIER: US 6080221 A
TITLE: Vacuum coated particulate fertilizers

Abstract Text (1):
A method of coating fertilizer particles exhibiting porous surfaces under vacuum to form attrition resistant controlled release particulate fertilizers, by drawing a vacuum on the fertilizer particles and applying thereto a water insoluble fluid resin at about atmospheric pressure, so that the fluid resin is forced into the porous surfaces of the fertilizer particles by differences in pressure, and then hardening the fluid resin to form a solid resin, tenaciously bonded onto, and into, the porous surfaces of the fertilizer particles. Porous surfaced water soluble, slow releasing and sulfur coated, fertilizers may be effectively coated. Granular, briquetted, compacted and other special shaped fertilizers may also be effectively vacuum coated to provide controlled release products. Pesticides may also be effectively included in these attrition resistant products. Fertilizers are provided which exhibit substantially improved resistance to attrition.

Brief Summary Text (2):
This invention relates to the field of plant nutrients, and more particularly to, particulate fertilizers coated with attrition resistant tenacious resin. The new fertilizer composition provides stronger, less frangible, coatings and thereby more reliable release of plant nutrients and pesticides than previously disclosed compositions. The new fertilizer particles contain small amounts of solid, water insoluble coating material, applied as a fluid, evenly coating fissures, cavities, cracks, crevices, holes, and all types of smooth and irregular shapes, called porous surfaces herein, on the fertilizer particles. In the new composition, the water insoluble coating materials are forced into, and onto, the fertilizer particle surfaces by pressure differences between the fertilizer particle subsurface, and the applied liquid coating material.

Brief Summary Text (5):
Rapid release of water soluble plant nutrients in soils containing plants may cause phytotoxicity to the plants, and/or the early depletion of the plant nutrient by leaching. Researchers for a long time have attempted to develop plant nutrient particles which release nutrients at about the same rate of their uptake by plants. Improved release control has been achieved by chemically modifying nutrients to form low solubility nutrients, such as ureaformaldehyde polymers, and by physically coating soluble nutrient granules with various low solubility materials, such as sulfur, paraffin wax, and plastics.

Brief Summary Text (6):
Most plant food nutrient particles used as fertilizers are not smooth surfaced spheroids. These particles usually contain substantial areas of porous surfaces, which comprise cavities, fissures, cracks, crevices, pores, holes, indentations, pits, interstices between small agglomerated particles, and smooth surfaces containing holes which penetrate to subsurface areas. All of these surface imperfections may be summarized by the term "porous surfaces." Porous surfaces usually cover more than fifteen percent of the apparent area of fertilizer particles. The actual surface area of the particles, counting the porous and subsurface areas, are usually much higher than the apparent area of smooth surfaced spheroids of equal diameters.

Brief Summary Text (7):
Until now, the porous surfaces of fertilizer particles have posed a problem in obtaining strong, attrition resistant, coatings, when coated controlled release fertilizers were made. The porous surfaces may be bridged when particles are coated with sulfur, or resins, by conventional means, such as spraying, or rolling at atmospheric pressure. When the coatings do not penetrate into the porous surfaces, the bonds between the coating material and the surface of the particle are weak, and the coated fertilizers are subject to serious attrition during shipping, handling, and applications. Many of the current coated fertilizers exhibit unpredictable nutrient release patterns because of weaknesses in the coatings bridging over porous surfaces on the coated plant nutrient particles. Likewise pesticides coated onto fertilizer particles are subject to unreliable release rates and tend to break off of the fertilizer causing inaccurate application as well as hazards during handling.

Brief Summary Text (8):
Commercial fertilizer granules are formed by aggregation of small particles of the fertilizer material, leaving many small cavities and interstices in the granule's porous surfaces. Some of the familiar products of this type are granulated urea, diammonium phosphate, monoammonium phosphate and potassium chloride. Many materials, such as prilled urea or ammonium nitrate form surface irregularities commonly called "dimples" when they shrink while solidifying in the prilling process, creating a porous surface.

Brief Summary Text (9):
Plastic coatings are usually applied to fertilizer particles as liquid resins, emulsions, or dispersions. The viscosities of these liquids are high enough that without a pressure driving force the liquids do not flow evenly over, and penetrate, the porous surfaces of the fertilizer particles. These liquids either bridge over the surface irregularities leaving thinly covered void space below, or leave the irregularities uncovered. When sulfur is used as the coating materials, coating is even less effective, because sulfur is viscous as a liquid, and is quickly solidified when it comes in contact with the fertilizer particles. Further application of sulfur, even on smooth surfaces, creates a new porous surface which tends to crack as it is stored or handled.

Brief Summary Text (10):
Fertilizer particles, such as urea and ammonium salts are polar materials which tend to inhibit absorption-adsorption of non-polar coatings, such as sulfur, plastics or resins. A driving force is needed to overcome the resistance of these materials to bond with each other.

Brief Summary Text (11):
The use of low viscosity monomers does allow better penetration of the monomers into the porous surfaces of the granules than with the more viscous materials such as sulfur and polymers, but still does not achieve the desired penetration and coverage. The monomers react with the fertilizer particles to form solid materials which block further flow of the monomers into the narrowed cavities of the porous surfaces. The monomers also require careful handling because of their toxicity.

Brief Summary Text (12):
Large particles of fertilizers such as briquettes and pellets are used in special plant feeding operations such as aquaculture or tree fertilization. These particles, sometimes more than one centimeter in diameter and thickness, are usually formed by briquetting, or granulating, smaller particles. These large particles contain very large numbers of surface cavities resulting from interstices between the small particles used. These cavities weaken any normal coating placed on the surface.

Brief Summary Text (13):
Blouin in U.S. Pat. No. 3,342,577 disclosed a sulfur coating process, using an oil based sealer, and a diatomaceous earth conditioner to produce controlled release plant food granules. Hansen in U.S. Pat. Nos. 3,259,482 and 3,264,089 taught the preparation of slow release fertilizers by coating soluble granules with expoxidized soybean oil with a polyester curing agent and with polyurethane polymers.

Brief Summary Text (14):
Moore in U.S. Pat. Nos. 4,711,659, 4,781,749, and 4,804,403 taught the reaction of low viscosity monomers with soluble fertilizer granules and with other monomers to form water insoluble coatings chemically connected with, and sealed to, the soluble fertilizer granules.

Brief Summary Text (16):
release, of sulfur coated fertilizer products by applying polymeric topcoats as a sealant over fresh sulfur coatings. Detrick in U.S. Pat. No. 5,599,374 disclosed a sulfur-coated urea slow release granular fertilizer having a durable polymeric coating over the sulfur coating. The polymer coating was formed by the direct in-situ copolymerization of diethylene glycol-triethanolamine polyol and a diisocyanate on the surface of the sulfur coated urea granule.

Brief Summary Text (17):
In summary, the fertilizers of the prior art have improved the release of plant nutrients from fertilizer particles, but they still have the serious defects of excess frangibility of the coatings caused by the bridging of porous surfaces, and failure to form strong, continuous, bonds with the complete particle surfaces. The use of the prior art methods require care to prevent bubbles in the coating material and use of low shear handling of the coating materials. The prior art methods are not well suited to coating sulfur coated fertilizers which contain frangible, porous surfaces, and the prior art offers no effective method of drawing biologically active additives into the surfaces of fertilizer granules.

Brief Summary Text (19):
I have now discovered that plant nutrient particles exhibiting porous surfaces may be coated with tenacious resins to form attrition resistant fertilizers by subjecting the particles to lower than one atmosphere pressure and then applying a water insoluble fluid resin, at about one atmosphere pressure onto the particles. The pressure difference between the particles and the porous surfaces of the particles forces the liquid resin into the cracks, cavities, fissures, crevices, interstices, holes, and all types of irregular shapes of the particle surfaces. It is surprising that the fluid resin retains its higher pressure long enough to force it into the porous surfaces of the granules maintained at a lower pressure. The fluid resin is also forced into the particle subsurfaces through small holes even on smooth surfaces. Conventional resin curing techniques may be used to convert the water insoluble fluid resins to solid tenacious resin strongly bonded to the surface of the plant nutrient particles. Controlled release fertilizer particles which are resistant to attrition from handling, shipping and application are provided.

Brief Summary Text (24):
The instant invention provides a method of coating plant nutrient particles, exhibiting porous surfaces, with tenacious resin to form attrition resistant particulate fertilizers. In the instant method, plant nutrient particles which exhibit porous surfaces are placed in a coating vessel equipped for operation at less than one atmosphere pressure. The pressure is reduced in the coating vessel to less than one atmosphere, and water insoluble fluid resin at a pressure of about one atmosphere is applied to the surfaces of the plant nutrient particles so that the fluid resin is forced into the porous surfaces of the particles by a difference in pressure between the porous surface of the particles and the fluid resin. The fluid resin is converted to solid tenacious resin bonded into the porous surfaces of the plant nutrient particles by curing the resin.

Brief Summary Text (25):
Most of the commercially available particulate water soluble fertilizer materials exhibit porous surfaces which are suitable for coating using the instant method. These materials include urea, ammonium sulfate, ammonium phosphate, potassium chloride, potassium nitrate, and potassium nitrate.

Brief Summary Text (26):
The method is also effective when the plant nutrient particles exhibiting porous surfaces are slow releasing fertilizers. Materials which are coated effectively, include, ureaform, magnesium ammonium phosphate, magnesium potassium phosphate, isobutylidene diurea, oxamide, granulated poultry waste, and aminoureaformaldehyde

polymers.

Brief Summary Text (27):
Some of the water insoluble fertilizers exhibiting porous surfaces which are suitable for coating using the instant method are water soluble fertilizer particles coated with water insoluble inorganic materials including sulfur, magnesium ammonium phosphate, magnesium potassium phosphate, calcium phosphate, magnesium phosphate, and zinc phosphate. These coating materials are insoluble enough to protect the soluble nutrients which they coat but usually have poor physical integrity and thus are subject to serious attrition and loss of efficacy when they are handled and in many cases during storage. They therefore need a resin coating to provide the attrition resistance necessary for effective commercial use. Sulfur coated urea is a large scale product which exhibits a very rough and porous surface which needs treatment to reduce its very high attrition rate and which may be effectively coated by the instant method.

Brief Summary Text (28):
Most plant food particles exhibit very porous surfaces in which the total surface areas are many times larger than the apparent area calculated from the particle's external measurements. Granules, briquettes, compacted pieces, tablets, extrusions, and pellets are all formed as practical and useful fertilizer particles by agglomeration of many small particles by various means. These agglomerates contain very porous surfaces and large subsurface areas and interstices. When these particles are coated by methods of the prior art, many parts of the particles are not bonded to the coating and attrition during handling, shipping and applying is a serious problem, causing loss of reliability in nutrient release control. When the foregoing agglomerated fertilizer particles are coated by the instant method, good attrition resistance is achieved with retention of controlled release of the plant nutrients.

Brief Summary Text (30):
Prills produced by solidifying melts, such as sodium nitrate or potassium nitrate, usually contain holes or irregularities called dimples which amount to about 10 percent of the area of the particles. These prills may be effectively coated by the instant method. Other fertilizer particles, for example, diammonium phosphate, or urea granules exhibit surfaces that are almost completely porous, containing little or no smooth surfaces for bonding with coatings, without large number of places where the coating is not bonded with the granule surface.

Brief Summary Text (34):
The amount of the water insoluble fluid resin applied to the porous surfaces of the plant nutrient particles may be varied substantially between 0.5 and 20 percent of the attrition resistant particulate fertilizer on a dry basis, depending upon the condition of the surface of the plant nutrient particles, the rate of nutrient release desired, and economics. The application of less than 0.5 percent usually does not provide desired improvement in attrition resistance and more than 20 percent provides slower release of nutrients than is usually desired.

Brief Summary Text (35):
The surfaces of fertilizer particles vary widely in their porosity, shape, and size. The degree of control of release of plant nutrient desired also varies widely depending to a large extent upon the use the fertilizer is to be put to. These variations may be accommodated by this invention. To meet the need of varying rates of nutrient release, the instant method may be used wherein the water insoluble fluid resin is applied to the porous surfaces of the plant nutrient particles as a plurality of coating layers. As the number of layers is increased, the rate of nutrient release is decreased.

Brief Summary Text (37):
The method may be effectively used where the water insoluble resin is applied to the porous surfaces of the plant nutrient particles by spraying at a pressure of between 0.7 and 3.5 atmospheres. This application technique is effective when the fluid resin is a thin liquid such as an aqueous emulsion. It is noted that systems of the prior art were unable to spray resin onto fertilizer particles because the technique left bubbles in the coatings. In the instant method, operating at pressures lower

than atmospheric, bubbles in the coatings are not a problem as entrained air is forced out of the coatings before the coatings are hardened.

Brief Summary Text (40):
It was discovered that the products prepared by the instant method are unlike coated particles of the prior art and are attrition resistant particles exhibiting tenacious resin coatings penetrating into porous surfaces of the fertilizer particles.

Brief Summary Text (41):
Fertilizer granules are the most common form of commercially manufactured plant nutrient particles. A preferred method of preparing attrition resistant controlled release fertilizers consisting of granules, exhibiting porous surfaces, coated with tenacious resins, has been defined. In this method, fertilizer particles which exhibit porous surfaces amounting to more than 15 percent of the total surface of the particles are charged into a coating vessel comprising a tank rotating around its horizontal center axis, causing the contained fertilizer granules to roll and thereby expose the surfaces of the fertilizer granules for coating.

Brief Summary Text (42):
The pressure in the coating vessel and the porous surfaces of the fertilizer granules therein is reduced to between 0.06 and 0.40 atmosphere for a period of time between 30 and 300 seconds by means by a vacuum producing device, such as a vacuum pump, aspirator, or steam jet. The reduced pressure is maintained between 0.06 and 0.40 atmospheres and a water insoluble fluid resin which is an aqueous resin dispersion, amounting to between 2 and 15 percent of the fertilizer granules, containing between 15 and 40 percent resin, is applied at about 1 atmosphere pressure to the surfaces of the fertilizer granules, so that the fluid resin is forced into the porous surfaces of the fertilizer granules by differences in pressure between the porous surfaces and the fluid resin. This amount of resin coating is sufficient to provide controlled release of the fertilizer.

Brief Summary Text (43):
The fluid resin is converted to solid tenacious resin bonded onto, and into, the surfaces of the fertilizer granules, forming attrition resistant controlled release granular fertilizers, by heating to a temperature between 60 and 120.degree. C. to dehydrate the aqueous resin dispersion.

Brief Summary Text (44):
The preferred method, described in the foregoing paragraphs, provides a new and improved product which comprises attrition resistant controlled release fertilizer granules, exhibiting porous surfaces coated with tenacious resins penetrating into the interstices between the agglomerated particles which form the granules.

Brief Summary Text (45):
As mentioned previously, the method of this invention is useful for converting sulfur coated fertilizer particles exhibiting poor resistance to attrition and erratic nutrient release properties into granules with good resistance to attrition, and reliable nutrient release patterns. The method best suited for preparing attrition resistant slow release fertilizers from particulate sulfur coated fertilizers contains four steps. In the first step particulate fertilizers, coated with between 8 and 25 percent sulfur and exhibiting diameters between 0.5 and 4.5 millimeters and porous surfaces amounting to more than 15 percent of the total surface of the particulate fertilizers at a temperature between 75 and 100.degree. C., is charged into a coating vessel comprising a tank rotating around its center horizontal axis, causing the particulate fertilizers to roll and thereby expose the surfaces of the fertilizer particles for coating.

Brief Summary Text (46):
The pressure in the coating vessel and the porous surfaces of the particulate sulfur coated fertilizers therein is reduced to between 0.06 and 0.40 atmospheres for a period of time between 30 and 300 seconds.

Brief Summary Text (47):
The reduced pressure is maintained at between 0.06 and 0.40 atmospheres, and a

molten water insoluble resin is applied at a temperature between 75 and 130.degree. C. at a pressure of about 1 atmosphere, so that the molten resin is forced into, and onto, the porous surfaces by differences in pressure between the porous surfaces and the molten resin. The molten resin amounts to between 0.5 and 5.0 percent of the attrition resistant slow release fertilizer product. It is effective to use a variety of molten resins including polyolefins, ethylene vinyl acetate copolymer, polyurethane, grafted polyamide-polypropylene, and polyepoxy resins. In the fourth step the attrition resistant slow release fertilizers are cooled to a temperature lower than 50.degree. C. to improve the storage properties of the granules.

Brief Summary Text (48):
The instant method of coating porous surfaces of fertilizer particles with tenacious resin may be effectively used as a method of coating porous surfaces of fertilizer particles with tenacious pesticide-resin solids to form attrition resistant fertilizer-pesticide combination particles. In this use of the method, fertilizer particles exhibiting porous surfaces amounting to more than 15 percent of the total surface of the particles are charged into a coating vessel which comprises a tank rotating around its horizontal center axis, causing the contained fertilizer particles to roll, and thereby, expose the surfaces of the fertilizer particles for coating. The pressure in the coating vessel and the porous surfaces of the fertilizer particles is reduced to between 0.06 and 0.75 atmosphere for a period of time between 30 and 600 seconds. The reduced pressure is maintained between 0.06 and 0.75 atmosphere, and a pesticide dispersed in a resinoid, containing between 5 and 60 percent pesticide, is applied at about one atmosphere pressure to the surfaces of the fertilizer particles so that the pesticide dispersed in the resinoid is forced into, and onto,

Brief Summary Text (49):
the porous surfaces of the fertilizer particles by differences in pressure between the porous surface and the pesticide dispersed in the resinoid.

Brief Summary Text (50):
The pesticide dispersed in the resinoid is converted to a tenacious pesticide-resin solid bonded onto, and into, the porous surfaces of the fertilizer particles by heating at a temperature between 60 and 130.degree. C. until the resinoid cures and forms a hardened resin providing attrition resistance for the pesticide and forming attrition resistant fertilizer-pesticide combination particles.

Brief Summary Text (52):
Pesticides which may be effectively used in the instant method include insecticides, fungicides, acaricides and herbicides. The preferred pesticides for use in the instant method include the following commercially available pesticides: Pendimethalin, N-(1-ethylpropyl)-3,4-dimethyl-2,6-dinitrobenzenamine; Dursban, [0,0-diethyl-0-(3,5,6-trichloro-2-pyridyl)phosphorothioate]; Merit, 1-[(6-Chloro-3-pyridinyl)methyl]-N-nitro-2-imidazolidinimine; Aliette, Aluminum tris (0-ethyl phosphonate); Subdue, N-(2,6-dimethylphenyl)-N-(methoxyacetyl)alanine methyl ester; and Bayleton, 1-(4-chlorophenoxy)-3,3-dimethyl-1-(1H-1,2,4-triazol-1-yl)-2-but anone.

Brief Summary Text (53):
The instant method provides a particulate attrition resistant combination fertilizer-pesticide composition which safely retains between 0.01 and 10 percent pesticide during handling and application.

Brief Summary Text (55):
Having described the basic concepts of the instant invention reference is now made to the following examples which are provided to illustrate the invention's method of coating plant nutrient particles, exhibiting porous surfaces, with tenacious resin to form attrition resistant particulate fertilizers.

Detailed Description Text (2):
This example demonstrates the vacuum coating method of preparing attrition resistant controlled release particulate fertilizers from water soluble urea granules.

Detailed Description Text (10):

This example demonstrates the attrition resistance of the vacuum coated fertilizer granules compared to conventionally coated fertilizer granules.

Detailed Description Text (13):
This example demonstrates the vacuum coating method of preparing attrition resistant slow release fertilizers from water soluble fertilizer particles coated with water insoluble inorganic materials, particularly sulfur.

Detailed Description Text (18):
This example demonstrates the improved efficacy of the vacuum coated fertilizers of the instant invention over that of conventionally coated fertilizers. The product of Example 3 and a sample of sulfur coated urea conventionally coated with an additional coating of 2 percent modified polyethylene were put through the ball mill attrition test and the 7-day dissolution test of Example 2. The results are tabulated in the following table.

Detailed Description Text (20):
This example demonstrates a four step vacuum method of coating surfaces of fertilizer particles with tenacious pesticide-resin solids to form attrition resistant fertilizer-pesticide combination particles.

Detailed Description Text (21):
Granulated 19-2-19-2Fe-10(S) fertilizer particles were screened to provide -8+14 (Tyler screen) particles. The fertilizer comprised aminoureaformaldehyde, potassium sulfate, ammonium sulfate, and sodium phosphate. Microscopic examination of the surface of the granules showed that more than 50 percent of the surface could be classified as porous, as the granules contained large amounts of interstices between small particles, and large numbers of crevices, cracks, and holes. The fertilizer granules amounting to 200 pounds were charged in the double cone dryer of Example 1, at 80.degree. C., in the first step.

Detailed Description Text (22):
In the second step, the pressure in the double cone dryer, and the porous surfaces of the fertilizer particles, was reduced to 0.10 atmosphere by means of a vacuum pump for 5 minutes.

Detailed Description Text (24):
The linseed oil containing the N-(1-ethylpropyl)-3,4-dimethyl-2,6-dinitrobenzenamine was converted in the fourth step to a tenacious pesticide-resin solid bonded onto and into the porous surfaces of the 19-2-19-2Fe fertilizer granules by heating for 20 minutes at 110.degree. C. until the resinoid heat bodied linseed oil cured and formed a hardened resin providing attrition resistant Pentamethylin coated 19-2-19-2Fe granules. The product composition is tabulated as follows:

Detailed Description Text (26):
This example demonstrates that attrition resistant particulate fertilizers exhibiting tenacious resin coatings penetrating into the porous surfaces of the fertilizer particles prepared by the instant method are new, qualitatively different compositions and provide improved performance over compositions of the prior art.

Detailed Description Text (27):
Product was prepared in the equipment and in the procedure of Example 1, except that the fluid resin used in the coating was an aqueous polyurethane dispersion containing 40 percent resin and 60 percent water, and the fertilizer particles were -6+8 mesh urea granules. The coating vessel was operated at a temperature of 82.degree. C. and a pressure of 0.11 atmosphere. The polyurethane dispersion was added at atmospheric pressure at 91.degree. C. in ten doses, until the total amount of polyurethane resin added amounted to 7 percent on a dry basis.

Detailed Description Text (29):
For comparison ten granules of a commercial granular fertilizer coated with 6 percent polyurethane applied by conventional spraying at atmospheric pressure were selected and mounted in clear plastic for electron microscopy. The photomicrographs showed frequent skips of the coating over porous portions of the granule surface, and thin "windows" of coating over holes and other types of uneven surfaces of the

particle. The bonding between coating and fertilizer was not continuous, and the coating did not penetrate into the porous surfaces of the particles.

Detailed Description Text (32):
Merion Bluegrass in 800 ml pots was grown in the greenhouse and fertilized with the product of Example 3, the sulfur coated granules of Example 3 without the resin coating, and with a sulfur coated urea coated with an additional 2 percent polyethylene by the conventional atmospheric pressure method.

Detailed Description Text (33):
The turf response to the fertilizer treatments were related by measurement of the weight of fresh grass cuttings. The controlled releases of the fertilizers were determined by the measurement of grass growth, after much of the initial soluble nutrients were spent, in the period between days 60 and 130 of the tests. The results are tabulated in the following table.

Detailed Description Paragraph Table (4):

Component Wt %
Fertilizer 19-2-19-2Fe 98.04 Heat Bodied Linseed Oil 1.86 Pentamethylin 0.10

CLAIMS:

1. A method of coating plant nutrient particles, exhibiting porous surfaces, with tenacious resin to form attrition resistant particulate fertilizers, comprising:

(a) placing plant nutrient particles, which exhibit porous surfaces, in a coating vessel equipped for operation at pressures less than one atmosphere;

(b) reducing pressure in the coating vessel and the plant nutrient particles to less than one atmosphere;

(c) applying water insoluble fluid resin, at about one atmosphere pressure, to the surfaces of the plant nutrient particles so that the fluid resin is forced into the porous surfaces of the particles by a difference in pressure between the porous surfaces of the particles and the fluid resin; and,

(d) converting the fluid resin to solid tenacious resin bonded into the porous surfaces of the plant nutrient particles by curing the resin.

2. The method of claim 1 wherein the plant nutrient particles exhibiting porous surfaces comprise particulate water soluble fertilizer materials selected from the group consisting of urea, ammonium sulfate, ammonium phosphate, potassium chloride, potassium nitrate, and potassium sulfate.

3. The method of claim 1 wherein the plant nutrient particles exhibiting porous surfaces comprise particulate slow releasing fertilizer materials selected from the group consisting of ureaform, magnesium ammonium phosphate, magnesium potassium phosphate, isobutylidene diurea, oxamide, granulated poultry waste, and aminoureaformaldehyde polymers.

4. The method claim 1 wherein the plant nutrient particles exhibiting porous surfaces comprise water soluble fertilizer particles coated, to slow nutrient release, with water insoluble inorganic materials selected from the group consisting of sulfur, magnesium ammonium phosphate, magnesium potassium phosphate, calcium phosphate, magnesium phosphate, and zinc phosphate.

5. The method of claim 1 wherein the plant nutrient particles exhibiting porous surfaces comprise fertilizer particles agglomerated into shapes selected from the group consisting of briquettes, granules, pieces of compacted particles, tablets, extrusions, pellets, and prills.

10. The method of claim 1 wherein the water insoluble fluid resin applied to the porous surfaces of the plant nutrient particles amounts to between 0.5 and 20 percent of the attrition resistant particulate fertilizer on a dry basis.

16. Attrition resistant particulate fertilizers exhibiting tenacious resin coatings penetrating into porous surfaces of the fertilizer particles prepared by the method of claim 1.

17. A method of preparing attrition resistant controlled release fertilizers consisting of granules exhibiting porous surfaces, coated with tenacious resins, comprising:

(a) charging fertilizer particles which exhibit porous surfaces amounting to more than 15 percent of the total surface of the particles, into a coating vessel comprising a tank rotating around its horizontal center axis, causing the contained fertilizer granules to roll and thereby expose the surfaces of the fertilizer granules for coating;

(b) reducing the pressure, by means of a vacuum producing device, in the coating vessel and the porous surfaces of the fertilizer granules therein to between 0.06 and 0.40 atmospheres for a period of time between 30 and 300 seconds;

(c) maintaining the reduced pressure at between 0.06 and 0.40 atmospheres and applying water insoluble fluid resin, comprising an aqueous resin dispersion containing between 15 and 40 percent resin, at about 1 atmosphere pressure, to the surfaces of the fertilizer granules so that the fluid resin, amounting to between 2 and 15 percent of the fertilizer granules, is forced into the porous surfaces of the fertilizer granules by difference in pressure between the porous surfaces and the fluid resin;

(d) converting the fluid resin to solid tenacious resin bonded onto, and into, the surfaces of the fertilizer granules, to form attrition resistant controlled release granular fertilizers by heating to a temperature between 60 and 120.degree. C. to dehydrate the aqueous resin dispersion.

18. Attrition resistant controlled release fertilizer granular composition containing fertilizer granules exhibiting porous surfaces coated with tenacious resins penetrating into the interstices between agglomerated particles which form the granules, prepared by the method of claim 17.

19. A four step method of preparing attrition resistant slow release fertilizers from particulate sulfur coated fertilizers, comprising:

(a) charging particulate fertilizers, coated with between 8 and 25 percent sulfur, and exhibiting particle diameters between 0.5 and 4.5 millimeters and porous surfaces amounting to more than 15 percent of the total surface of the particulate fertilizers, at a temperature between 75 and 100.degree. C., into a coating vessel comprising a tank rotating around its center horizontal axis, causing the particulate fertilizers to roll and thereby expose the surfaces of the fertilizer particles for coating;

(b) reducing pressure in the coating vessel and the porous surfaces of the particulate sulfur coated fertilizers to a pressure of between 0.06 and 0.40 atmosphere for a period of time between 30 and 300 seconds;

(c) maintaining the pressure at between 0.06 and 0.40 atmospheres and applying at a temperature of between 75 and 130.degree. C., at a pressure of about 1 atmosphere, a molten water insoluble resin selected form the group consisting of polyolefins, ethylene vinyl acetate copolymer, polyurethane, grafted polyamide-polypropylene, and polyepoxy, to the porous surfaces of the particulate fertilizers coated with sulfur, so that the molten resin is forced into, and onto, the porous surfaces by differences in pressure between the porous surfaces and the molten resin, the molten resin applied amounting to between 0.5 and 5.0 percent of the attrition resistant slow release fertilizers; and,

(d) cooling the attrition resistant slow release fertilizers to a temperature less than 50.degree. C.

21. A method of coating porous surfaces of fertilizer particles with tenacious pesticide-resin solids to form attrition resistant fertilizer-pesticide combination particles comprising:

(a) charging fertilizer particles exhibiting porous surfaces amounting to more than 15 percent of the total surface of the particles, into a coating vessel comprising a tank rotating around its horizontal center axis causing the contained fertilizer particles to roll, and thereby, expose the surfaces of the fertilizer particles for coating;

(b) reducing pressure in the coating vessel and the porous surfaces of the fertilizer particles by means of a vacuum pump to a pressure between 0.06 and 0.75 atmosphere for a period of time between 30 and 600 seconds;

(c) maintaining the reduced pressure at between 0.06 and 0.75 atmosphere and applying a pesticide dispersed in a resinoid, containing between 5 and 60 percent pesticide, at about one atmosphere pressure, to the surfaces of the fertilizer particles so that pesticide dispersed in the resinoid is forced into, and onto, the porous surfaces of the fertilizer particles by differences in pressure between the porous surfaces and the pesticide dispersed in the resinoid; and,

(d) converting the pesticide dispersed in the resinoid to a tenacious pesticide-resin solid bonded onto, and into, the porous surfaces of the fertilizer particles, forming attrition resistant fertilizer-pesticide combination particles, by heating at a temperature between 60 and 130.degree. C. until the resinoid cures and forms a hardened resin providing attrition resistance for the pesticide.

22. The method of claim 21 wherein the pesticide is selected from the group consisting of insecticides, fungicides, acaricides, and herbicides.

24. An attrition resistant particulate combination fertilizer-pesticide composition which retains between 0.01 and 10.00 percent pesticide during handling and application, prepared by the method of claim 21.